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APPENDICES

APPENDIX 2-A
EQUIPMENT DIMENSIONS

Exhibit 2-A
Equipment Dimensions

Equipment/System	Height (ft)	Length East-West (ft)	Depth North-South (ft)	Diameter (ft)
Raw and Fire Water Storage Tank	30	n/a	n/a	50
Demineralized Water Tank	30	n/a	n/a	78
Closed Cooling Water Fin-Fan Coolers	30	55	45	n/a
Fire Pump Module	16	14	33	n/a
Admin/Control Building Warehouse	25	140	48	n/a
Water Treatment Module	14	40	12	n/a
Sampling Container	15	10	18	n/a
Laboratory Container	15	36	12	n/a
STG Power Control Center	17	40	12	n/a
Cycle Chemical Feed Module	10	36	10	n/a
Ammonia Storage (Horizontal Tank)	20	n/a	50	9
HRSG Structure	96	150	48	n/a
HRSG Stack	160	n/a	n/a	22
Combustion Turbine Enclosures	31	45	36	n/a
Combustion Turbine Generator Enclosures	21	25	33	n/a
Combustion Turbine Inlet Air Filters	68	55	51	n/a
CT Lube Oil Skid and Coolers	36	27	11	n/a
GT Generator Step-Up Transformer	30	20	28	n/a
ST Generator Step-Up Transformer	34	28	40	n/a
Emergency Shutdown Generator	17	10	32	n/a
MV Switchgear Module	12	40	15	n/a
BOP Power Control Center	17	40	12	n/a
Air Cooled Condenser	135	350	180	n/a
Switchyard Module				n/a
Steam Turbine Generator	28	24	29	n/a
Steam Turbine Generator Enclosure HP-IP	32	45	28	n/a
LP Steam Turbine - with Crossover Pipe	44	22	20	n/a
Steam Turbine Building (Alternate)	99	99	180	n/a
Startup Frequency Converters	12	24	14	n/a
Generator Circuit Breakers	26			n/a
Auxiliary Boiler	20	38	50	n/a

APPENDIX 4.1A

CALCULATION OF MAXIMUM HOURLY, DAILY, AND ANNUAL EMISSIONS

APPENDIX 4.1A

Calculation of Maximum Hourly, Daily, and **Annual Emissions**

Tables presented in this Appendix are as follows:

4.1A-1A-C	Turbine/Aux Boiler Criteria Pollutant Emissions (including GHGs)
4.1A-2	Turbine HAPs Emissions
4.1A-3	Turbine Startup/Shutdown Emissions
4.1A-4A-C	Auxiliary Boiler HAPs Emissions
4.1A-5	Emergency Generator Criteria and HAPs Emissions (including GHGs)
4.1A-6	Fire-pump Criteria and HAPs Emissions (including GHGs)
4.1A-7	Natural Gas Analysis Data
4.1A-8	Typical ULSFO Analysis
4.1A-9	Commissioning Emissions Estimates
4.1A-10	Fuel Use Calculations for Turbines/duct burners

In addition to the above tables, other miscellaneous support data for the device-specific emissions calculations is also included in this Appendix.

Attachment 4.1A-1	Turbine Run Scenario Specification Sheets
Attachment 4.1A-2	Fire Pump and Gen Set Engine Specification Sheets
Attachment 4.1A-3	Auxiliary Boiler Specification Sheets

Table 4.1A-1A

Maximum Hourly, Daily, and Annual Emissions Calculations

Number of Identical Engines:	2
Turbine Model:	SCC6-5000F

Case #: Ops Scenario 1 - Cold Day and ISO Cases

Input data per unit:

Max Operation hrs/day	Max Annual Op hrs	Avg # of Cold Startups day	Avg # of Warm Startups day	Avg # of Hot Startups day	Cold Startup Time hrs	Warm Startup Time hrs	Hot Startup Time hrs	Shutdown Time hrs	Cold Starts events/yr	Warm Starts events/yr	Hot Starts events/yr	Estimated Shutdowns yr	Max Estimated Shutdowns day
24	8000	0	0	0	0.65	0.583	0.5	0.417	5	35	0	40	0

	Cold Startup Emissions lbs/event	Warm Startup Emissions lbs/event	Hot Startup Emissions lbs/event	Shutdown Emissions lbs/event	Steady State Emissions w/o DB lbs/hr *Case11*	Steady State Emissions w/DB lbs/hr *Case 12*	Worst Hr Emissions w/DB lbs/hr *Case 2*	Total Cold Start hrs/yr	Total Warm Start hrs/yr	Total Hot Start hrs/yr	Total Shutdown hrs/yr	Annual Steady State Non SU/SD hrs/yr	Total Annual Emissions: Cold Starts lbs/yr	Warm Starts lbs/yr	Hot Starts lbs/yr	Shutdowns lbs/yr
NOx	51.48	46.80	43.20	33.00	16.70	18.10	18.50	3.25	20.405	0	16.68	7959.665	257.4	1638.0	0.00	1320.0
CO	415.80	378.00	304.80	75.90	10.20	11.00	11.30				Total SU-SD Hours/Yr:	40.335	2079.0	13230.0	0.00	3036.0
VOC	30.36	27.60	27.60	19.80	3.00	6.18	6.36					Steady State Hour Breakdown	151.8	966.0	0.00	792.0
SOx	0.88	0.88	0.75	0.75	1.40	1.50	1.50					Hrs/yr	4.4	30.8	0.00	30.0
PM10	7.56	7.56	6.48	4.07	9.70	11.70	11.80		Duct burner firing, max hours/yr:			1500	37.8	264.6	0.00	162.8
PM2.5	7.56	7.56	6.48	4.07	9.70	11.70	11.80		Non-duct burner firing, hours/yr:			6459.665	37.8	264.6	0.00	162.8
NH3	7.20	7.20	8.60	7.20	15.40	16.80	17.20						36.0	252.0	0.00	288.0
Notes:					ISO+ Day	ISO+ Day	Cold Day									

Cold start plus shutdown =	1.067	hrs
Warm start plus shutdown =	1	hrs
Hot start plus shutdown =	0.917	hrs
Shut down =	0.417	hrs

Annual Fuel Use Values	mmbtu/hr	hrs/yr		mmbtu/yr
Case11 w/o DB *	2221.42	6500		14439230
Case 12 w/DB	2409.55	1500		3614325
*includes SU/SD hours			Total =	18053555

Maximum Estimated Annual Emissions

	NOx lbs/yr	CO lbs/yr	VOC lbs/yr	SOx lbs/yr	PM10 lbs/yr	PM2.5 lbs/yr	NH3 lbs/yr
Ops Scenario							
Cold Startups	257.4	2079.0	151.8	4.4	37.8	37.8	
Warm Startups	1638.0	13230.0	966.0	30.8	264.6	264.6	
Hot Startups	0.0	0.0	0.0	0.0	0.0	0.0	
Shutdowns	1320.0	3036.0	792.0	30.0	162.8	162.8	
Steady State w/o DB	107876.4	65888.6	19379.0	9043.5	62658.8	62658.8	99478.8
Steady State w/DB	27150.0	16500.0	9270.0	2250.0	17550.0	17550.0	25200.0
1 Turbine Total, lbs/yr:	*138241.8*	*100733.6*	*30558.8*	*11358.7*	*80674.0*	*80674.0*	*124678.8*
1 Turbine Total, tons/yr:	69.12	50.37	15.28	5.68	40.34	40.34	62.34

		NOx tpy	CO tpy	VOC tpy	SOx tpy	PM10 tpy	PM2.5 tpy	NH3 tpy
	Total Tons/Yr All Units:	**138.24**	**100.73**	**30.56**	**11.36**	**80.67**	**80.67**	**124.68**
EPA	PSD Program Trigger Levels, TPY:	100	100	100	100	100	100	
EPA	PSD Significant Emissions Rates, TPY:	40	100	40	40	15	10	
AVAQMD	Air Agency Offset Trigger Levels, TPY:	25	100	25	25	15	15	

Maximum Estimated Daily Emissions based on a 24 Ops Cold Day

Max Daily Emissions Assumptions (Per turbine):		**Hours**
cold starts per day =	1	0.65
warm starts per day =	0	0
hot starts per day =	0	0
shutdowns per day =	1	0.417
Steady state ops hrs/day =		22.933

	lbs/day	lbs/day all units
NOx	508.74	1017.48
CO	750.84	1501.69
VOC	196.01	392.03
SOx	36.00	72.00
PM10	283.20	566.40
PM2.5	283.20	566.40
NH3	408.85	817.70

Maximum Estimated Hourly Emissions

Max hourly emissions assumptions (Per turbine):	Hours
1. Cold startup	0.65
2. remainder of hour, cold day no DB, Case 1	0.35
3. NH3 is cold day data-steady state	

	lbs/hr	lbs/hr All Units	Case 1 for used for remaining hour of start (lb/hr)
NOx	57.47	114.93	17.1
CO	419.44	838.88	10.4
VOC	31.41	62.82	3
SOx	1.50	3.00	1.4
PM10	11.80	23.60	9.8
PM2.5	11.80	23.60	9.8
NH3	12.73	25.46	15.8

GHG Emissions Estimates

Fuel:	Natural Gas				short		CO2e		
Btu/scf:	1024	HHV	*Emissions*	lbs/yr	tons/yr	IPCC SAR	short		
Heat Rate:	18053555	mmbtu/yr		2.11E+09	1.06E+06	Values	tons/yr		
Fuel Rate:	17630.4248	mmscf/yr		3.98E+04	1.99E+01	1	1.06E+06		
Emissions Factors				3.98E+03	1.99E+00	21	4.18E+02		
CO2	116.89	lbs/mmbtu				310	6.17E+02		
CH4	0.002205	lbs/mmbtu				Total CO2e:	1,056,175	short TPY	1 Engine
N2O	0.0002205	lbs/mmbtu				Total CO2e:	2,112,350	short TPY	All Engines
						Total CO2e:	960,159	metric TPY	1 Engine
						Total CO2e:	**1,920,318**	**metric TPY**	All Engines

Emissions Factors for GHG, 40 CFR 98, Subpart C, Tables C-1, C-2.

1 short ton = 2000 lbs, 1 metric ton = 2200 lbs.

Notes:

1. Turbine emissions based on the following:
   - NOx 2.0 ppm
   - CO 2.0 ppm
   - VOC 1.0 - 2.0 ppm
2. Startup data has 20% and 10% margin added to the startup and shutdown emissions, respectively.
3. Cold start event data is based on 100% turbine load at end of start cycle
4. Short-term emissions based on 23 degree day
5. Annual emissions based on 64 degree day with 1500 hours of DB
6. GT+DB VOC at 2.2 ppm reduced to BACT level of 2.0 ppm

Data References:

1. Siemens, Summit Palmdale, 2x1 Estimated Stack Emissions Sheet, April 16, 2015
2. Siemens, Startup/Shutdown Emissions Sheet
3. Siemens, Summit Palmdale, 2x1 ACC, Performance Estimate Data Sheet, april 17, 2015
4. Siemens, Summit Palmdale, Total Plant Startup Curve, 2x1, SGT6-5000F with SST6-5000 ST, Rev 001, April 17, 2015
5. AVAQMD, FDOC, 5-13-2010, Table 1.

Aux Boiler

Calculation of Criteria Pollutant Emissions for Boilers Firing Gaseous Fuels

Boiler Operation Mode:	Normal Ops	# of Units:	1
Ops Hr/Day:	24	Fuel Type:	Nat Gas
Ops Hr/Yr:	836		

Calculation of Criteria Pollutant Emissions from Each Identical Unit

Compound	Emission Factor, lbs/mmbtu	Maximum Hourly Emissions, lb/hr	Maximum Daily Emissions, lb/day	Maximum Annual Emissions, lbs/yr	Annual Emissions, ton/yr	All Units Maximum Hourly Emissions, lb/hr	All Units Maximum Daily Emissions, lb/day	All Units Maximum Annual Emissions, lbs/yr	All Units Annual Emissions, ton/yr
NOx	0.0110	1.21	29.04	1011.56	0.51	1.21	29.04	1011.6	0.51
CO	0.0370	4.07	97.68	3402.52	1.70	4.07	97.68	3402.5	1.70
VOC	0.0060	0.66	15.84	551.76	0.28	0.66	15.84	551.8	0.28
SOx	0.0006	0.07	1.58	55.18	0.03	0.07	1.58	55.2	0.03
PM10	0.0070	0.77	18.48	643.72	0.32	0.77	18.48	643.7	0.32
PM2.5	0.0070	0.77	18.48	643.72	0.32	0.77	18.48	643.7	0.32
	lbs/MMbtu								
CO2	116.88800	12857.68	308584.32	10749020.48	5374.51	12857.68	308584.32	10749020.5	5374.51
Methane	0.00220	0.24	5.82	202.74	0.10	0.24	5.82	202.7	0.10
N2O	0.00022	0.02	0.58	20.27	0.01	0.02	0.58	20.3	0.01
CO2e								*short tons*	5380.1
								metric tons	4891.0

Notes:
(1) natural gas criteria pollutant EF factors
(2) Based on maximum hourly boiler fuel use of 110 MMBtu/hr/boiler
and fuel HHV of 1027 Btu/scf gives 0.1071 MMscf/hr/boiler.
(3) Based on maximum annual boiler fuel use of 91,960 MMBtu/yr/boiler
and fuel HHV of 1027 Btu/scf gives 89.5424 MMscf/yr/boiler.
(4) PM2.5 = PM10

Refs:
(1) EFs from PHPP 08-AFC-9, Appendix G
(2) GHG Factors and HHV value from 40 CFR 98.38, Tables C-1, C-2
(3) LNBs/FGR and GCPs
(4) SCR not proposed
(5) SO2 based on nat gas at 0.20 grs S/100scf

Maximum Emissions Totals for Ops Scenario (Turbines, DBs, Aux Boiler)

	NOx	CO	VOC	SOx	PM10	PM2.5	NH3	CO2e
lbs/hr	116.14	842.95	63.48	3.07	24.37	24.37	25.46	-
lbs/day	1019.90	1509.83	393.35	72.13	567.94	567.94	817.70	-
TPY	138.75	102.43	30.83	11.39	81.00	81.00	124.68	2117730

Table 4.1A-1B

Maximum Hourly, Daily, and Annual Emissions Calculations

Case #: Ops Scenario 2 - Cold Day and ISO Cases

Number of Identical Engines: 2
Turbine Model: SCC6-5000F

Input data per unit:

Max Operation hrs/day	Max Annual Op hrs	Avg # of Cold Startups day	Avg # of Warm Startups day	Avg # of Hot Startups day	Cold Startup Time hrs	Warm Startup Time hrs	Hot Startup Time hrs	Shutdown Time hrs	Cold Starts events/yr	Warm Starts events/yr	Hot Starts events/yr	Estimated Shutdowns yr	Max Estimated Shutdowns day
24	4320	0	1	1	0.65	0.583	0.5	0.417	5	360	360	725	2

	Cold Startup Emissions lbs/event	Warm Startup Emissions lbs/event	Hot Startup Emissions lbs/event	Shutdown Emissions lbs/event	Steady State Emissions w/o DB lbs/hr *Case11*	Steady State Emissions w/DB lbs/hr *Case 12*	Worst Hr Emissions w/DB lbs/hr *Case 2*	Total Cold Start hrs/yr	Total Warm Start hrs/yr	Total Hot Start hrs/yr	Total Shutdown hrs/yr	Annual Steady State Non SU/SD hrs/yr	Total Annual Emissions Cold Starts lbs/yr	Warm Starts lbs/yr	Hot Starts lbs/yr	Shutdowns lbs/yr
NOx	51.48	46.80	43.20	33.00	16.70	18.10	18.50	3.25	209.88	180	302.325	3624.545	257.4	16848.0	15552.00	23925.0
CO	415.80	378.00	304.80	75.90	10.20	11.00	11.30			Total SU-SD Hours/Yr:		695.455	2079.0	136080.0	109728.00	55027.5
VOC	30.36	27.60	27.60	19.80	3.00	6.18	6.36				Steady State Hour Breakdown		151.8	9936.0	9936.00	14355.0
SOx	0.88	0.88	0.75	0.75	1.40	1.50	1.50					Hrs/yr	4.4	316.8	270.00	543.8
PM10	7.56	7.56	6.48	4.07	9.70	11.70	11.80		Duct burner firing, max hours/yr:			1500	37.8	2721.6	2332.80	2950.8
PM2.5	7.56	7.56	6.48	4.07	9.70	11.70	11.80		Non-duct burner firing, hours/yr:			2124.545	37.8	2721.6	2332.80	2950.8
NH3	7.20	7.20	8.60	7.20	15.40	16.80	17.20						36.0	2592.0	3096.00	5220.0
Notes:					ISO+ Day	ISO+ Day	Cold Day									

Cold start plus shutdown =	1.067	hrs
Warm start plus shutdown =	1	hrs
Hot start plus shutdown =	0.917	hrs
Shut down =	0.417	hrs

Annual Fuel Use Values	mmbtu/hr	hrs/yr		mmbtu/yr
Case11 w/o DB *	2221.42	2820		6264404.4
Case 12 w/DB	2409.55	1500		3614325
*includes SU/SD hours			Total =	9878729.4

Maximum Estimated Annual Emissions

Ops Scenario	NOx lbs/yr	CO lbs/yr	VOC lbs/yr	SOx lbs/yr	PM10 lbs/yr	PM2.5 lbs/yr	NH3 lbs/yr
Cold Startups	257.4	2079.0	151.8	4.4	37.8	37.8	
Warm Startups	16848.0	136080.0	9936.0	316.8	2721.6	2721.6	
Hot Startups	15552.0	109728.0	9936.0	270.0	2332.8	2332.8	
Shutdowns	23925.0	55027.5	14355.0	543.8	2950.8	2950.8	
Steady State w/o DB	35479.9	21670.4	6373.6	2974.4	20608.1	20608.1	32718.0
Steady State w/DB	27150.0	16500.0	9270.0	2250.0	17550.0	17550.0	25200.0
1 Turbine Total, lbs/yr:	*119212.3*	*341084.9*	*50022.4*	*6359.3*	*46201.0*	*46201.0*	*57918.0*
1 Turbine Total, tons/yr:	59.61	170.54	25.01	3.18	23.10	23.10	28.96

		NOx tpy	CO tpy	VOC tpy	SOx tpy	PM10 tpy	PM2.5 tpy	NH3 tpy
	Total Tons/Yr All Units:	**119.21**	**341.08**	**50.02**	**6.36**	**46.20**	**46.20**	**57.92**
EPA	PSD Program Trigger Levels, TPY:	100	100	100	100	100	100	
EPA	PSD Significant Emissions Rates, TPY:	40	100	40	40	15	10	
AVAQMD	Air Agency Offset Trigger Levels, TPY:	25	100	25	25	15	15	

Maximum Estimated Daily Emissions based on a 24 Ops Cold Day

Max Daily Emissions Assumptions (Per turbine):		**Hours**
cold starts per day =	0	0
warm starts per day =	1	0.583
hot starts per day =	1	0.5
shutdowns per day =	2	0.834
Steady state ops hrs/day =		22.083

	lbs/day	lbs/day all units
NOx	564.54	1129.07
CO	1084.14	2168.28
VOC	235.25	470.50
SOx	36.00	72.00
PM10	283.20	566.40
PM2.5	283.20	566.40
NH3	410.03	820.06

Maximum Estimated Hourly Emissions

Max hourly emissions assumptions (Per turbine):	Hours
1. Cold startup	0.65
2. remainder of hour, cold day no DB, Case 1	0.35
3. NH3 is cold day data-steady state	

	lbs/hr	lbs/hr All Units	Case 1 for used for remaining hour of start (lb/hr)
NOx	57.47	114.93	17.1
CO	419.44	838.88	10.4
VOC	31.41	62.82	3
SOx	1.50	3.00	1.4
PM10	11.80	23.60	9.8
PM2.5	11.80	23.60	9.8
NH3	12.73	25.46	15.8

GHG Emissions Estimates

						IPCC SAR	CO2e		
Fuel:	Natural Gas				short		CO2e		
Btu/scf:	1027	HHV	*Emissions*	lbs/yr	tons/yr	IPCC SAR	short		
Heat Rate:	9878729.4	mmbtu/yr		1.15E+09	5.77E+05	Values	tons/yr		
Fuel Rate:	9619.0160	mmscf/yr		2.18E+04	1.09E+01	1	5.77E+05		
Emissions Factors				2.18E+03	1.09E+00	21	2.29E+02		
CO2	116.89	lbs/mmbtu				310	3.38E+02		
CH4	0.002205	lbs/mmbtu				Total CO2e:	577,929	short TPY	1 Engine
N2O	0.0002205	lbs/mmbtu				Total CO2e:	1,155,857	short TPY	All Engines
						Total CO2e:	525,390	metric TPY	1 Engine
						Total CO2e:	**1,050,779**	**metric TPY**	All Engines

Emissions Factors for GHG, 40 CFR 98, Subpart C, Tables C-1, C-2.

1 short ton = 2000 lbs, 1 metric ton = 2200 lbs.

Notes:

1. Turbine emissions based on the following:
    NOx 2.0 ppm
    CO 2.0 ppm
    VOC 1.0 - 2.0 ppm
2. Startup data has 20% and 10% margin added to the startup and shutdown emissions, respectively.
3. Cold start event data is based on 100% turbine load at end of start cycle
4. Short-term emissions based on 23 degree day
5. Annual emissions based on 64 degree day with 1500 hours of DB
6. GT+DB VOC at 2.2 ppm reduced to BACT level of 2.0 ppm

Data References:

1. Siemens, Summit Palmdale, 2x1 Estimated Stack Emissions Sheet, April 16, 2015
2. Siemens, Startup/Shutdown Emissions Sheet
3. Siemens, Summit Palmdale, 2x1 ACC, Performance Estimate Data Sheet, april 17, 2015
4. Siemens, Summit Palmdale, Total Plant Startup Curve, 2x1, SGT6-5000F with SST6-5000 ST, Rev 001, April 17, 2015
5. AVAQMD, FDOC, 5-13-2010, Table 1.

Aux Boiler

Calculation of Criteria Pollutant Emissions for Boilers Firing Gaseous Fuels

Boiler Operation Mode:	Normal Ops	# of Units:	1
Ops Hr/Day:	24	Fuel Type:	Nat Gas
Ops Hr/Yr:	4884		

	Calculation of Criteria Pollutant Emissions from Each Identical Unit					All Units			
Compound	Emission Factor, lbs/mmbtu	Maximum Hourly Emissions, lb/hr	Maximum Daily Emissions, lb/day	Maximum Annual Emissions, lbs/yr	Annual Emissions, ton/yr	Maximum Hourly Emissions, lb/hr	Maximum Daily Emissions, lb/day	Maximum Annual Emissions, lbs/yr	Annual Emissions, ton/yr
NOx	0.0110	1.21	29.04	5909.64	2.95	1.21	29.04	5909.6	2.95
CO	0.0370	4.07	97.68	19877.88	9.94	4.07	97.68	19877.9	9.94
VOC	0.0060	0.66	15.84	3223.44	1.61	0.66	15.84	3223.4	1.61
SOx	0.0006	0.07	1.58	322.34	0.16	0.07	1.58	322.3	0.16
PM10	0.0070	0.77	18.48	3760.68	1.88	0.77	18.48	3760.7	1.88
PM2.5	0.0070	0.77	18.48	3760.68	1.88	0.77	18.48	3760.7	1.88
	lbs/MMbtu								
CO2	116.88800	12857.68	308584.32	62796909.12	31398.45	12857.68	308584.32	62796909.1	31398.45
Methane	0.00220	0.24	5.82	1184.40	0.59	0.24	5.82	1184.4	0.59
N2O	0.00022	0.02	0.58	118.44	0.06	0.02	0.58	118.4	0.06
CO2e								*short tons*	31430.9
								metric tons	28573.8

Notes:

(1) natural gas criteria pollutant EF factors

(2) Based on maximum hourly boiler fuel use of 110 MMBtu/hr/boiler
and fuel HHV of 1027 Btu/scf gives 0.1071 MMscf/hr/boiler.

(3) Based on maximum annual boiler fuel use of 537,240 MMBtu/yr/boiler
and fuel HHV of 1027 Btu/scf gives 523.1159 MMscf/yr/boiler.

(4) PM2.5 = PM10

Refs:

(1) EFs from PHPP 08-AFC-9, Appendix G

(2) GHG Factors and HHV value from 40 CFR 98.38, Tables C-1, C-2

(3) LNBs/FGR and GCPs

(4) SCR not proposed

(5) SO2 based on nat gas at 0.20 grs S/100scf

Maximum Emissions Totals for Ops Scenario (Turbines, DBs, Aux Boiler)

	NOx	CO	VOC	SOx	PM10	PM2.5	NH3	CO2e
lbs/hr	116.14	842.95	63.48	3.07	24.37	24.37	25.46	-
lbs/day	1131.49	2176.42	471.82	72.13	567.94	567.94	820.06	-
TPY	122.17	351.02	51.63	6.52	48.08	48.08	57.92	1187288

Table 4.1A-1C

Maximum Hourly, Daily, and Annual Emissions Calculations

Number of Identical Engines: 2

Turbine Model: SCC6-5000F

Case #: Ops Scenario 3 - Cold Day and ISO Cases

Input data per unit:

Max Operation hrs/day	Max Annual Op hrs	Avg # of Cold Startups day	Avg # of Warm Startups day	Avg # of Hot Startups day	Cold Startup Time hrs	Warm Startup Time hrs	Hot Startup Time hrs	Shutdown Time hrs	Cold Starts events/yr	Warm Starts events/yr	Hot Starts events/yr	Estimated Shutdowns yr	Max Estimated Shutdowns day
24	5000	0	1	1	0.65	0.583	0.5	0.417	5	360	180	545	2

	Cold Startup Emissions lbs/event	Warm Startup Emissions lbs/event	Hot Startup Emissions lbs/event	Shutdown Emissions lbs/event	Steady State Emissions w/o DB lbs/hr *Case11*	Steady State Emissions w/DB lbs/hr *Case 12*	Worst Hr Emissions w/DB lbs/hr *Case 2*	Total Cold Start hrs/yr	Total Warm Start hrs/yr	Total Hot Start hrs/yr	Total Shutdown hrs/yr	Annual Steady State Non SU/SD hrs/yr	Total Annual Emissions Cold Starts lbs/yr	Warm Starts lbs/yr	Hot Starts lbs/yr	Shutdowns lbs/yr
NOx	51.48	46.80	43.20	33.00	16.70	18.10	18.50	3.25	209.88	90	227.265	4469.605	257.4	16848.0	7776.00	17985.0
CO	415.80	378.00	304.80	75.90	10.20	11.00	11.30			Total SU-SD Hours/Yr:		530.395	2079.0	136080.0	54864.00	41365.5
VOC	30.36	27.60	27.60	19.80	3.00	6.18	6.36			Steady State Hour Breakdown			151.8	9936.0	4968.00	10791.0
SOx	0.88	0.88	0.75	0.75	1.40	1.50	1.50					Hrs/yr	4.4	316.8	135.00	408.8
PM10	7.56	7.56	6.48	4.07	9.70	11.70	11.80		Duct burner firing, max hours/yr:			1500	37.8	2721.6	1166.40	2218.2
PM2.5	7.56	7.56	6.48	4.07	9.70	11.70	11.80		Non-duct burner firing, hours/yr:			2969.605	37.8	2721.6	1166.40	2218.2
NH3	7.20	7.20	8.60	7.20	15.40	16.80	17.20						36.0	2592.0	1548.00	3924.0
Notes:					ISO+ Day	ISO+ Day	Cold Day									

Cold start plus shutdown =	1.067	hrs
Warm start plus shutdown =	1	hrs
Hot start plus shutdown =	0.917	hrs
Shut down =	0.417	hrs

Annual Fuel Use Values	mmbtu/hr	hrs/yr		mmbtu/yr
Case11 w/o DB *	2221.42	3500		7774970
Case 12 w/DB	2409.55	1500		3614325
*includes SU/SD hours			Total =	11389295

Maximum Estimated Annual Emissions

Ops Scenario	NOx lbs/yr	CO lbs/yr	VOC lbs/yr	SOx lbs/yr	PM10 lbs/yr	PM2.5 lbs/yr	NH3 lbs/yr
Cold Startups	257.4	2079.0	151.8	4.4	37.8	37.8	
Warm Startups	16848.0	136080.0	9936.0	316.8	2721.6	2721.6	
Hot Startups	7776.0	54864.0	4968.0	135.0	1166.4	1166.4	
Shutdowns	17985.0	41365.5	10791.0	408.8	2218.2	2218.2	
Steady State w/o DB	49592.4	30290.0	8908.8	4157.4	28805.2	28805.2	45731.9
Steady State w/DB	27150.0	16500.0	9270.0	2250.0	17550.0	17550.0	25200.0
1 Turbine Total, lbs/yr:	*119608.8*	*281178.5*	*44025.6*	*7272.4*	*52499.1*	*52499.1*	*70931.9*
1 Turbine Total, tons/yr:	59.80	140.59	22.01	3.64	26.25	26.25	35.47

		NOx tpy	CO tpy	VOC tpy	SOx tpy	PM10 tpy	PM2.5 tpy	NH3 tpy
	Total Tons/Yr All Units:	**119.61**	**281.18**	**44.03**	**7.27**	**52.50**	**52.50**	**70.93**
EPA	PSD Program Trigger Levels, TPY:	100	100	100	100	100	100	
EPA	PSD Significant Emissions Rates, TPY:	40	100	40	40	15	10	
AVAQMD	Air Agency Offset Trigger Levels, TPY:	25	100	25	25	15	15	

Maximum Estimated Daily Emissions based on a 24 Ops Cold Day

Max Daily Emissions Assumptions (Per turbine):		**Hours**
cold starts per day =	0	0
warm starts per day =	1	0.583
hot starts per day =	1	0.5
shutdowns per day =	2	0.834
Steady state ops hrs/day =		22.083

	lbs/day	lbs/day all units
NOx	564.54	1129.07
CO	1084.14	2168.28
VOC	235.25	470.50
SOx	36.00	72.00
PM10	283.20	566.40
PM2.5	283.20	566.40
NH3	410.03	820.06

Maximum Estimated Hourly Emissions

Max hourly emissions assumptions (Per turbine):	Hours
1. Cold startup	0.65
2. remainder of hour, cold day no DB, Case 1	0.35
3. NH3 is cold day data-steady state	

	lbs/hr	lbs/hr All Units	Case 1 for used for remaining hour of start (lb/hr)
NOx	57.47	114.93	17.1
CO	419.44	838.88	10.4
VOC	31.41	62.82	3
SOx	1.50	3.00	1.4
PM10	11.80	23.60	9.8
PM2.5	11.80	23.60	9.8
NH3	12.73	25.46	15.8

GHG Emissions Estimates

Fuel:	Natural Gas				short		CO2e		
Btu/scf:	1027	HHV	*Emissions*	lbs/yr	tons/yr	IPCC SAR	short		
Heat Rate:	11389295	mmbtu/yr		1.33E+09	6.66E+05	Values	tons/yr		
Fuel Rate:	11089.8685	mmscf/yr		2.51E+04	1.26E+01	1	6.66E+05		
Emissions Factors				2.51E+03	1.26E+00	21	2.64E+02		
CO2	116.89	lbs/mmbtu				310	3.89E+02		
CH4	0.002205	lbs/mmbtu				Total CO2e:	666,300	short TPY	1 Engine
N2O	0.0002205	lbs/mmbtu				Total CO2e:	1,332,601	short TPY	All Engines
						Total CO2e:	605,728	metric TPY	1 Engine
						Total CO2e:	**1,211,455**	**metric TPY**	All Engines

Emissions Factors for GHG, 40 CFR 98, Subpart C, Tables C-1, C-2.

1 short ton = 2000 lbs, 1 metric ton = 2200 lbs.

Notes:

1. Turbine emissions based on the following:
   - NOx 2.0 ppm
   - CO 2.0 ppm
   - VOC 1.0 - 2.0 ppm
2. Startup data has 20% and 10% margin added to the startup and shutdown emissions, respectively.
3. Cold start event data is based on 100% turbine load at end of start cycle
4. Short-term emissions based on 23 degree day
5. Annual emissions based on 64 degree day with 1500 hours of DB
6. GT+DB VOC at 2.2 ppm reduced to BACT level of 2.0 ppm

Data References:

1. Siemens, Summit Palmdale, 2x1 Estimated Stack Emissions Sheet, April 16, 2015
2. Siemens, Startup/Shutdown Emissions Sheet
3. Siemens, Summit Palmdale, 2x1 ACC, Performance Estimate Data Sheet, april 17, 2015
4. Siemens, Summit Palmdale, Total Plant Startup Curve, 2x1, SGT6-5000F with SST6-5000 ST, Rev 001, April 17, 2015
5. AVAQMD, FDOC, 5-13-2010, Table 1.

Aux Boiler

Calculation of Criteria Pollutant Emissions for Boilers Firing Gaseous Fuels

Boiler Operation Mode:	Normal Ops	# of Units:	1
Ops Hr/Day:	24	Fuel Type:	Nat Gas
Ops Hr/Yr:	4136		

Calculation of Criteria Pollutant Emissions from Each Identical Unit

Compound	Emission Factor, lbs/mmbtu	Maximum Hourly Emissions, lb/hr	Maximum Daily Emissions, lb/day	Maximum Annual Emissions, lbs/yr	Annual Emissions, ton/yr	All Units Maximum Hourly Emissions, lb/hr	All Units Maximum Daily Emissions, lb/day	All Units Maximum Annual Emissions, lbs/yr	All Units Annual Emissions, ton/yr
NOx	0.0110	1.21	29.04	5004.56	2.50	1.21	29.04	5004.6	2.50
CO	0.0370	4.07	97.68	16833.52	8.42	4.07	97.68	16833.5	8.42
VOC	0.0060	0.66	15.84	2729.76	1.36	0.66	15.84	2729.8	1.36
SOx	0.0006	0.07	1.58	272.98	0.14	0.07	1.58	273.0	0.14
PM10	0.0070	0.77	18.48	3184.72	1.59	0.77	18.48	3184.7	1.59
PM2.5	0.0070	0.77	18.48	3184.72	1.59	0.77	18.48	3184.7	1.59
	lbs/MMbtu								
CO2	116.88800	12857.68	308584.32	53179364.48	26589.68	12857.68	308584.32	53179364.5	26589.68
Methane	0.00220	0.24	5.82	1003.00	0.50	0.24	5.82	1003.0	0.50
N2O	0.00022	0.02	0.58	100.30	0.05	0.02	0.58	100.3	0.05
CO2e								*short tons*	26617.2
								metric tons	24197.7

Notes:
(1) natural gas criteria pollutant EF factors
(2) Based on maximum hourly boiler fuel use of 110 MMBtu/hr/boiler
and fuel HHV of 1027 Btu/scf gives 0.1071 MMscf/hr/boiler.
(3) Based on maximum annual boiler fuel use of 454,960 MMBtu/yr/boiler
and fuel HHV of 1027 Btu/scf gives 442.9990 MMscf/yr/boiler.
(4) PM2.5 = PM10

Refs:
(1) EFs from PHPP 08-AFC-9, Appendix G
(2) GHG Factors and HHV value from 40 CFR 98.38, Tables C-1, C-2
(3) LNBs/FGR and GCPs
(4) SCR not proposed
(5) SO2 based on nat gas at 0.20 grs S/100scf

Maximum Emissions Totals for Ops Scenario (Turbines, DBs, Aux Boiler)

	NOx	CO	VOC	SOx	PM10	PM2.5	NH3	CO2e
lbs/hr	116.14	842.95	63.48	3.07	24.37	24.37	25.46	-
lbs/day	1131.49	2176.42	471.82	72.13	567.94	567.94	820.06	-
TPY	122.11	289.60	45.39	7.41	54.09	54.09	70.93	1359218

Table 4.1A-2
Calculation of Hazardous and Toxic Pollutant Emissions

# of Units:	2	
Fuel HHV:	1024	btu/scf

Calculation of Noncriteria Pollutant Emissions from Gas Turbines

			(each turbine)			All Turbines			
Compound	Emission Factor, lb/MMscf	CO Catalyst Control Multiplier	Maximum Hourly Emissions, lb/hr	Maximum Daily Emissions, lb/day	Annual Emissions, lb/yr	Maximum Hourly Emissions, lb/hr	Maximum Daily Emissions, lb/day	Annual Emissions, lb/yr	Annual Emissions, tons/yr
Acetaldehyde	1.37E-01	2.00E-01	6.60E-02	1.58E+00	4.83E+02	1.32E-01	3.17E+00	9.66E+02	4.83E-01
Acrolein	1.89E-02	2.00E-01	9.11E-03	2.19E-01	6.66E+01	1.82E-02	4.37E-01	1.33E+02	6.66E-02
Ammonia	(3)		1.72E+01	4.13E+02	1.38E+05	3.44E+01	8.26E+02	2.75E+05	1.38E+02
Benzene	1.33E-02	2.00E-01	6.41E-03	1.54E-01	4.69E+01	1.28E-02	3.08E-01	9.38E+01	4.69E-02
1,3-Butadiene	1.27E-04	2.00E-01	6.12E-05	1.47E-03	4.48E-01	1.22E-04	2.94E-03	8.96E-01	4.48E-04
Ethylbenzene	1.79E-02	2.00E-01	8.63E-03	2.07E-01	6.31E+01	1.73E-02	4.14E-01	1.26E+02	6.31E-02
Formaldehyde	9.17E-01	5.00E-01	1.10E+00	2.65E+01	8.08E+03	2.21E+00	5.30E+01	1.62E+04	8.08E+00
Hexane	2.59E-01	2.00E-01	1.25E-01	3.00E+00	9.13E+02	2.50E-01	5.99E+00	1.83E+03	9.13E-01
Naphthalene	1.66E-03	2.00E-01	8.00E-04	1.92E-02	5.85E+00	1.60E-03	3.84E-02	1.17E+01	5.85E-03
Total PAHs	2.41E-04	2.00E-01	1.16E-04	2.79E-03	8.50E-01	2.32E-04	5.57E-03	1.70E+00	8.50E-04
Propylene	7.71E-01	2.00E-01	3.72E-01	8.92E+00	2.72E+03	7.43E-01	1.78E+01	5.44E+03	2.72E+00
Propylene oxide	4.78E-02	2.00E-01	2.30E-02	5.53E-01	1.69E+02	4.61E-02	1.11E+00	3.37E+02	1.69E-01
Toluene	7.10E-02	2.00E-01	3.42E-02	8.21E-01	2.50E+02	6.84E-02	1.64E+00	5.01E+02	2.50E-01
Xylene	2.61E-02	2.00E-01	1.26E-02	3.02E-01	9.20E+01	2.52E-02	6.04E-01	1.84E+02	9.20E-02
*	0.00E+00	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	0.00E+00	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	0.00E+00	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	0.00E+00	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	0.00E+00	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	0.00E+00	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	0.00E+00	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	0.00E+00	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	0.00E+00	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	0.00E+00	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	0.00E+00	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Notes:

(1) Provided by CATEF database.

(2) Based on maximum hourly turbine fuel use of: 2.4093E+00 mmscf/hr
Case 2, cold day, with duct firing
Based on a maximum daily turbine fuel use of: 5.7823E+01 mmscf/day
Case 2, cold day, with duct firing
Based on maximum annual turbine fuel use of: 1.7630E+04 mmscf/yr
Cases 11 and 12, ISO day, with and without duct firing
Fuel use values from Fuel Calculation Sheet

(3) Values from ammonia slip calculations by Siemens, Case 12, ISO Day

(4) Fuel use values include HRSG duct burner(s) Yes or No: Yes

Each Turbine	24	Max hrs/day
Each Turbine	8000	Max Hrs/yr

CO Catalyst Control Efficiencies

	Control Frac.	Multiplier
Organic HAPs	0.80	0.20
Inorganic HAPs	0.50	0.50

Table 4.1A-3 Startup and Shutdown Emissions Estimates

Mode	Time (min)	Pounds per Event					Pounds per Event with margin				
		NOx	CO	VOC	PM	Fuel Use	NOx	CO	VOC	PM	Fuel Use
"Cold" Startup (GT Ignition to Emissions Compliance @ 70% GT Load)	35	34	312	22	5.1	37,601	40.8	374.4	26.4	6.12	37,601
"Cold" Startup (GT Ignition to Emissions Compliance @ 100% GT Load)	39	42.9	346.5	25.3	6.93	51,139	51.48	415.8	30.36	8.316	51,139
"Warm" Startup (GT Ignition to Emissions Compliance @ 100% GT Load)	35	39	315	23	6.3	46,490	46.8	378	27.6	7.56	46,490
"Hot" Startup (GT Ignition to Emissions Compliance @ 100% GT Load)	30	36	254	23	5.4	38,303	43.2	304.8	27.6	6.48	38,303
Shutdown (50% GT Load to Fuel Cut Off)	11	26	67	17	1.5	7,339	28.6	73.7	18.7	1.65	7,339
Shutdown (100% GT Load to Fuel Cut Off)	25	30	69	18	3.7	26,543	33	75.9	19.8	4.07	26,543

Assumes 20% margin on startup
Assumes 10% margin on shutdown

Table 4.1A-4A Aux Boiler

Calculation of Hazardous Air Pollutant Emissions for Boilers Firing Gaseous Fuels

Boiler Operation Mode:	Scenario 1		# of Units:	1
Max Hourly Fuel Use:	0.1074	mmscf	Fuel Type:	Nat Gas
Hrs/Yr:	836			
Max Annual Fuel Use:	89.7864	mmscf/yr		

Calculation of Hazardous Air Pollutant Emissions from Each Identical Unit

						All Units			
HAP	Emission Factor, lb/MMscf (1)	Maximum Hourly Emissions, lb/hr	Maximum Daily Emissions, lb/day	Maximum Annual Emissions, lbs/yr	Annual Emissions, ton/yr	Maximum Hourly Emissions, lb/hr	Maximum Daily Emissions, lb/day	Maximum Annual Emissions, lbs/yr	Annual Emissions, ton/yr
Acetaldehyde	9.00E-04	9.67E-05	n/a	8.08E-02	4.04E-05	9.67E-05	n/a	8.08E-02	4.04E-05
Acrolein	8.00E-04	8.59E-05	n/a	7.18E-02	3.59E-05	8.59E-05	n/a	7.18E-02	3.59E-05
Ammonia		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
Benzene	1.70E-03	1.83E-04	n/a	1.53E-01	7.63E-05	1.83E-04	n/a	1.53E-01	7.63E-05
1,3-Butadiene	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
Ethylbenzene	2.00E-03	2.15E-04	n/a	1.80E-01	8.98E-05	2.15E-04	n/a	1.80E-01	8.98E-05
Formaldehyde	3.60E-03	3.87E-04	n/a	3.23E-01	1.62E-04	3.87E-04	n/a	3.23E-01	1.62E-04
Hexane	1.30E-03	1.40E-04	n/a	1.17E-01	5.84E-05	1.40E-04	n/a	1.17E-01	5.84E-05
Naphthalene	3.00E-04	3.22E-05	n/a	2.69E-02	1.35E-05	3.22E-05	n/a	2.69E-02	1.35E-05
PAHs (4)	1.00E-04	1.07E-05	n/a	8.98E-03	4.49E-06	1.07E-05	n/a	8.98E-03	4.49E-06
Propylene	1.55E-02	1.66E-03	n/a	1.39E+00	6.96E-04	1.66E-03	n/a	1.39E+00	6.96E-04
Propylene oxide	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
Toluene	7.80E-03	8.38E-04	n/a	7.00E-01	3.50E-04	8.38E-04	n/a	7.00E-01	3.50E-04
Xylene	5.80E-03	6.23E-04	n/a	5.21E-01	2.60E-04	6.23E-04	n/a	5.21E-01	2.60E-04
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00

Notes:

(1) natural gas HAPs emission factors: Hidden Hills AFC, Table 5.1B-14R, April 2012.
(2) Fuel HHV 1024 btu/scf
(3) Polycyclic aromatic hydrocarbons, excluding naphthalene (treated separately).
(4) LNB with FGR and GCPs
(5) all fuel values based on full load equivalents per PEP Aux boiler data sheets

Table 4.1A-4B Aux Boiler

Calculation of Hazardous Air Pollutant Emissions for Boilers Firing Gaseous Fuels

Boiler Operation Mode:	Scenario 2		# of Units:	1
Max Hourly Fuel Use:	0.1074	mmscf	Fuel Type:	Nat Gas
Hrs/Yr:	4884			
Max Annual Fuel Use:	524.5416	mmscf/yr		

Calculation of Hazardous Air Pollutant Emissions from Each Identical Unit

						All Units			
HAP	Emission Factor, lb/MMscf (1)	Maximum Hourly Emissions, lb/hr	Maximum Daily Emissions, lb/day	Maximum Annual Emissions, lbs/yr	Annual Emissions, ton/yr	Maximum Hourly Emissions, lb/hr	Maximum Daily Emissions, lb/day	Maximum Annual Emissions, lbs/yr	Annual Emissions, ton/yr
Acetaldehyde	9.00E-04	9.67E-05	n/a	4.72E-01	2.36E-04	9.67E-05	n/a	4.72E-01	2.36E-04
Acrolein	8.00E-04	8.59E-05	n/a	4.20E-01	2.10E-04	8.59E-05	n/a	4.20E-01	2.10E-04
Ammonia		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
Benzene	1.70E-03	1.83E-04	n/a	8.92E-01	4.46E-04	1.83E-04	n/a	8.92E-01	4.46E-04
1,3-Butadiene	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
Ethylbenzene	2.00E-03	2.15E-04	n/a	1.05E+00	5.25E-04	2.15E-04	n/a	1.05E+00	5.25E-04
Formaldehyde	3.60E-03	3.87E-04	n/a	1.89E+00	9.44E-04	3.87E-04	n/a	1.89E+00	9.44E-04
Hexane	1.30E-03	1.40E-04	n/a	6.82E-01	3.41E-04	1.40E-04	n/a	6.82E-01	3.41E-04
Naphthalene	3.00E-04	3.22E-05	n/a	1.57E-01	7.87E-05	3.22E-05	n/a	1.57E-01	7.87E-05
PAHs (4)	1.00E-04	1.07E-05	n/a	5.25E-02	2.62E-05	1.07E-05	n/a	5.25E-02	2.62E-05
Propylene	1.55E-02	1.66E-03	n/a	8.13E+00	4.07E-03	1.66E-03	n/a	8.13E+00	4.07E-03
Propylene oxide	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
Toluene	7.80E-03	8.38E-04	n/a	4.09E+00	2.05E-03	8.38E-04	n/a	4.09E+00	2.05E-03
Xylene	5.80E-03	6.23E-04	n/a	3.04E+00	1.52E-03	6.23E-04	n/a	3.04E+00	1.52E-03
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00

Notes:

(1) natural gas HAPs emission factors: Hidden Hills AFC, Table 5.1B-14R, April 2012.

(2) Fuel HHV 1024 btu/scf

(3) Polycyclic aromatic hydrocarbons, excluding naphthalene (treated separately).

(4) LNB with FGR and GCPs

(5) all fuel values based on full load equivalents per PEP Aux boiler data sheets

Table 4.1A-4C Aux Boiler

Calculation of Hazardous Air Pollutant Emissions for Boilers Firing Gaseous Fuels

Boiler Operation Mode:	Scenario 3		# of Units:	1
Max Hourly Fuel Use:	0.1074	mmscf	Fuel Type:	Nat Gas
Hrs/Yr:	4136			
Max Annual Fuel Use:	444.2064	mmscf/yr		

Calculation of Hazardous Air Pollutant Emissions from Each Identical Unit

HAP	Emission Factor, lb/MMscf (1)	Maximum Hourly Emissions, lb/hr	Maximum Daily Emissions, lb/day	Maximum Annual Emissions, lbs/yr	Annual Emissions, ton/yr	All Units: Maximum Hourly Emissions, lb/hr	All Units: Maximum Daily Emissions, lb/day	All Units: Maximum Annual Emissions, lbs/yr	All Units: Annual Emissions, ton/yr
Acetaldehyde	9.00E-04	9.67E-05	n/a	4.00E-01	2.00E-04	9.67E-05	n/a	4.00E-01	2.00E-04
Acrolein	8.00E-04	8.59E-05	n/a	3.55E-01	1.78E-04	8.59E-05	n/a	3.55E-01	1.78E-04
Ammonia		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
Benzene	1.70E-03	1.83E-04	n/a	7.55E-01	3.78E-04	1.83E-04	n/a	7.55E-01	3.78E-04
1,3-Butadiene	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
Ethylbenzene	2.00E-03	2.15E-04	n/a	8.88E-01	4.44E-04	2.15E-04	n/a	8.88E-01	4.44E-04
Formaldehyde	3.60E-03	3.87E-04	n/a	1.60E+00	8.00E-04	3.87E-04	n/a	1.60E+00	8.00E-04
Hexane	1.30E-03	1.40E-04	n/a	5.77E-01	2.89E-04	1.40E-04	n/a	5.77E-01	2.89E-04
Naphthalene	3.00E-04	3.22E-05	n/a	1.33E-01	6.66E-05	3.22E-05	n/a	1.33E-01	6.66E-05
PAHs (4)	1.00E-04	1.07E-05	n/a	4.44E-02	2.22E-05	1.07E-05	n/a	4.44E-02	2.22E-05
Propylene	1.55E-02	1.66E-03	n/a	6.89E+00	3.44E-03	1.66E-03	n/a	6.89E+00	3.44E-03
Propylene oxide	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
Toluene	7.80E-03	8.38E-04	n/a	3.46E+00	1.73E-03	8.38E-04	n/a	3.46E+00	1.73E-03
Xylene	5.80E-03	6.23E-04	n/a	2.58E+00	1.29E-03	6.23E-04	n/a	2.58E+00	1.29E-03
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00
		0.00E+00	n/a	0.00E+00	0.00E+00	0.00E+00	n/a	0.00E+00	0.00E+00

Notes:

(1) natural gas HAPs emission factors: Hidden Hills AFC, Table 5.1B-14R, April 2012.

(2) Fuel HHV 1024 btu/scf

(3) Polycyclic aromatic hydrocarbons, excluding naphthalene (treated separately).

(4) LNB with FGR and GCPs

(5) all fuel values based on full load equivalents per PEP Aux boiler data sheets

Table 4.1A-5 Emergency Gen Set Emissions Estimates

EXPECTED INTERNAL COMBUSTION ENGINE EMISSIONS

Liquid Fuel

Emergency Generator

# of Identical Engines: 1

Mfg:	Caterpillar 3512C or Similar Engine		Stack Data			
Engine #:	2015 Family FCPXL78.1NZS		Height:	20	Ft.(1)	6.096 meters
kWe:	1500		Diameter:	0.6667	Ft.	0.2032 meters
BHP:	2011		Temp:	759	deg F	677.04 Kelvins
RPM:	1800		ACFM:	10908.7		158.76 m/s
Fuel:	#2 Diesel		input the mfg ACFM or calculate per Exhaust sheet)			
Fuel Use:	104.6	gal/hr	Area:	0.349	Sq.Ft.	
Fuel HHV:	139000	Btu/gal	Velocity:	521	Ft/Sec	
mmbtu/hr:	14.54	HHV	Max Daily Op Hrs/Emission Calcs Only:	1		
			Max Annual Op Hrs:	26		
Fuel Wt:	6.87	lbs/gal				
Fuel S:	0.0015	% wt.				
Fuel S:	0.10305	lbs/1000 gal				
SO2:	0.2061	lbs/1000 gal				
SO2:	9.779	equiv.g/hr				

If the engines will operate less than an hour for purposes of testing, the modeled emissions rates adjusted below accordingly.

		--- for 60 mins/hour ---		Single Engine				*All Engines*			
Emissions	**EF(g/hp-hr)**	**g/hr**	**g/s**	**Lb/Hr**	**Lb/Day**	**Lbs/Yr**	**Tons/Yr**	***Lb/Hr***	***Lb/Day***	***Lbs/Yr***	***Tons/Yr***
NOx	3.78	7601.58	2.112	16.758	16.758	435.7	0.218	*16.758*	*16.758*	*435.7*	*0.218*
CO	0.67	1347.37	0.374	2.970	2.970	77.2	0.039	*2.970*	*2.970*	*77.2*	*0.039*
HC	0.19	382.09	0.106	0.842	0.842	21.9	0.011	*0.842*	*0.842*	*21.9*	*0.011*
PM (2)	0.09	180.99	0.050	0.399	0.399	10.4	0.005	*0.399*	*0.399*	*10.4*	*0.005*
SOx (3)	NA	9.779	0.003	0.022	0.0216	0.56	0.0003	*0.0216*	*0.0216*	*0.56*	*0.0003*

Notes:

(1) Stack height set equal to 3.5' above structure height

(2) PM10/PM2.5 equals PM, used in HRA for DPM emissions

(3) Based on ultralow (15 ppm) sulfur fuel

(4) Based on 1.3409 bhp per kWe

Modeled Emission Rates		**g/s**	
	1-hr NOx	1.056	
0.5 hr/test	Ann NOx	6.267E-3	*and 1-hr NO2 NAAQS*
1 test/day	1-hr CO	0.187	
	8-hr CO	0.023	
	1-hr SO2	1.358E-3	
	3-hr SO2	4.527E-4	
	24-hr SO2	5.659E-5	
	24-hr PM	1.047E-3	
	Ann PM	1.492E-4	

Table 4.1A-5 Page 2 Greenhouse Gas Emissions Calculator

IC Engines-Diesel Fuel

Emissions Analysis Period: Annual

Facility Name:	Palmdale Energy Project			Oil Type:	Distillate	
				Grade:	#2 ULS	
IC Engine Device ID:	Emergency Gen Set			Op Hours:	26	Year
Engine Hp:	2011		Default Fuel Use Factor:	0	gal/hp-hr	
Engine Heat Rating:	14.54	mmbtu/hr	Estimated Fuel Use Rate:	104.6	gal/hr	

Oil Btu Content:	5.838	mmbtu/bbl			
Annual Oil Usage:	64.75505	bbls/yr	Carbon Content:	19.95	kg/mmbtu
	3.78E+02	mmbtu/yr	Frac Oxidized:	0.99	
Emissions Factors:			CO2/C Ratio:	3.6667	
CO2	73.96	kg/mmbtu or	Adjusted EF	72.4185	kg CO2/mmbtu
CH4	0.003	kg/mmbtu			
N2O	0.0006	kg/mmbtu			

		Emissions	IPCC	
	kg/yr	metric tons/yr	GWP/SAR	CO2e metric tons/yr
CO2	2.74E+04	27.37709	1	27.37709
CH4	1.13E+00	0.001134	21	0.023817
N2O	2.27E-01	0.000227	310	0.070315

Total	**27.5**	**CO2e metric tons/yr**
	30.2	CO2e short tons/yr

Source Specific Emissions Factor References, Data Notes, or Calculation Notes:
1. Default diesel fuel heat content = 139,000 btu/gal
2. Fuel use rate provided by mfg specification sheet, applicant, or see footnote 3.
3. Default fuel use factor from SCAQMD Rule 21 Staff Report, March 1995.
4. Ops data from PEP
5. EF Ref: FR 74, #209, Part 98 Subpart C, 10-30-2009, Pg. 56409-56411, Table C-1 and C-2.

Table 4.1A-6 Fire Pump Emissions Estimates

EXPECTED INTERNAL COMBUSTION ENGINE EMISSIONS

Liquid Fuel

Emergency Fire Pump

# of Identical Engines: 1

Mfg:	Clarke or Similar Engine	
Engine #:	#N/A	
kWe:	#N/A	
BHP:	140	
RPM:	1760	
Fuel:	#2 Diesel	
Fuel Use:	9.2	gal/hr
Fuel HHV:	139000	Btu/gal
mmbtu/hr:	1.28	HHV
Fuel Wt:	6.87	lbs/gal
Fuel S:	0.0015	% wt.
Fuel S:	0.10305	lbs/1000 gal
SO2:	0.2061	lbs/1000 gal
SO2:	0.860	equiv.g/hr

Stack Data

Height:	19.5	Ft.(1)	5.944 meters
Diameter:	0.4167	Ft.	0.1270 meters
Temp:	1023	deg F	823.71 Kelvins
ACFM:	755		28.13 m/s

input the mfg ACFM or calculate per Exhaust sheet)

Area:	0.1364	Sq.Ft.
Velocity:	92.28	Ft/Sec
Max Daily Op Hrs:	1	
Max Annual Op Hrs:	52	

If the engines will operate less than an hour for purposes of testing, correct the modeled emissions rates accordingly.

		--- for 60 mins/hour ---		Single Engine				All Engines			
Emissions	**g/hp-hr**	**EF(g/hr)**	**g/s**	**Lb/Hr**	**Lb/Day**	**Lbs/Yr**	**Tons/Yr**	***Lb/Hr***	***Lb/Day***	***Lbs/Yr***	***Tons/Yr***
NOx	2.80	392	0.109	0.864	0.864	44.9	0.022	*0.864*	*0.864*	*44.9*	*0.022*
CO	3.70	518	0.144	1.142	1.142	59.4	0.030	*1.142*	*1.142*	*59.4*	*0.030*
HC	0.20	28	7.778E-3	6.173E-2	6.173E-2	3.2	0.002	*0.062*	*0.062*	*3.2*	*0.002*
PM (2)	0.22	30.8	8.556E-3	6.790E-2	6.790E-2	3.5	0.002	*0.068*	*0.068*	*3.5*	*0.002*
SOx (3)	NA	0.860	2.389E-4	1.896E-3	1.896E-3	0.10	4.930E-5	*0.0019*	*0.0019*	*0.10*	*0.0000*
		140	client EF based on 0.25%s								

Notes:

(1) Stack height set equal to 3.5' above structure height

(2) PM10/PM2.5 equals PM, used in HRA for DPM emissions

(3) SOx EF 140 g/hr equal to sulfur content of 15 ppm

~0.01 %s

	Modeled Emission Rates	**g/s**	
	1-hr NOx	0.109	
1 hr/test	Ann NOx	6.464E-4	*and 1-hr NO2 NAAQS*
1 test/day	1-hr CO	0.144	
	8-hr CO	0.018	
	1-hr SO2	2.389E-4	
	3-hr SO2	7.964E-5	
	24-hr SO2	9.954E-6	
	24-hr PM	3.565E-4	
	Ann PM	5.079E-5	

Table 4.1A-6 Page 2 Greenhouse Gas Emissions Calculator

IC Engines-Diesel Fuel

Emissions Analysis Period: Annual

Facility Name:	Palmdale Energy Project				Oil Type:	Distillate
					Grade:	#2 ULS
IC Engine Device ID:	Fire Pump				Op Hours:	52 Year
Engine Hp:	140		Default Fuel Use Factor:	0	gal/hp-hr	
Engine Heat Rating:	1.28	mmbtu/hr	Estimated Fuel Use Rate:	9.2	gal/hr	
Oil Btu Content:	5.838	mmbtu/bbl				
Annual Oil Usage:	11.40116	bbls/yr	Carbon Content:	19.95	kg/mmbtu	
	6.66E+01	mmbtu/yr	Frac Oxidized:	0.99		
Emissions Factors:			CO2/C Ratio:	3.6667		
CO2	73.96	kg/mmbtu or	Adjusted EF	72.4185	kg CO2/mmbtu	
CH4	0.003	kg/mmbtu				
N2O	0.0006	kg/mmbtu				

		Emissions	IPCC	
	kg/yr	metric tons/yr	GWP/SAR	CO2e metric tons/yr
CO2	4.82E+03	4.820175	1	4.820175
CH4	2.00E-01	0.0002	21	0.004193
N2O	3.99E-02	3.99E-05	310	0.01238

Total	**4.8**	**CO2e metric tons/yr**
	5.3	CO2e short tons/yr

Source Specific Emissions Factor References, Data Notes, or Calculation Notes:
1. Default diesel fuel heat content = 139,000 btu/gal
2. Fuel use rate provided by mfg specification sheet, applicant, or see footnote 3.
3. Default fuel use factor from SCAQMD Rule 21 Staff Report, March 1995.
4. Ops data from PEP
5. EF Ref: FR 74, #209, Part 98 Subpart C, 10-30-2009, Pg. 56409-56411, Table C-1 and C-2.

Table 4.1A-7 Natural Gas Analysis Data-Palmdale Project

month	Btu HHV	spec gvty	n2	co2	methane	ethane	propane	i-butane	n-butane	i-pentane	n-pentane	c6 plus
jan	1018	0.579	0.38	1.11	96.45	1.80	0.17	0.02	0.03	0.01	0.00	0.02
feb	1019	0.580	0.38	1.15	96.37	1.74	0.25	0.03	0.04	0.01	0.00	0.02
mar	1014	0.577	0.39	1.15	96.76	1.49	0.15	0.02	0.02	0.00	0.00	0.01
apr	1021	0.580	0.51	0.93	96.07	2.21	0.20	0.03	0.03	0.01	0.00	0.01
may	1017	0.581	0.67	1.07	95.70	2.36	0.22	0.03	0.03	0.01	0.00	0.01
jun	1034	0.585	0.33	0.87	94.81	3.47	0.20	0.03	0.03	0.00	0.00	0.01
jul	1033	0.585	0.34	0.91	95.01	3.45	0.23	0.03	0.03	0.00	0.00	0.01
aug	1033	0.585	0.32	0.92	94.90	3.65	0.17	0.02	0.02	0.00	0.00	0.01
sep	1034	0.586	0.33	0.91	94.75	3.80	0.17	0.01	0.01	0.00	0.00	0.01
oct	1035	0.587	0.34	0.93	94.71	3.75	0.22	0.02	0.02	0.00	0.00	0.01
nov	1036	0.587	0.33	0.95	94.54	3.96	0.18	0.02	0.02	0.00	0.00	0.00
dec	1035	0.589	0.40	1.07	94.23	4.06	0.20	0.02	0.02	0.00	0.00	0.01

HHV = 1024 btu/scf used for application analyses.

Table 4.1A-8 Low Sulfur Diesel Fuel Characteristics

Property	Typical Value
Aromatics, V%	20.9
Aromatics, Wt%	21.4
Sulfur, ppm	<= 15
PNA, Wt%	2.77
T10, deg C	199
T50, deg C	248
T90, deg C	317
Density, g/ml	0.8285
CA-Methane Min Limit %	88
CA-Ethane Max Limit %	6
CA-Propane Max Limit	3
HHV, btu/gallon	139,000
Ref: BP-ARCO	

Table 4.1A-9 Commissioning Emissions Estimates

Commissioning Emissions Commissioning Phase	First Fire and Synch Checks	GT Emissions and Combustion Tuning	SCR Commissioning	CC Tuning & Testing	Total	tons for both units
SCR Installed	No	No	50%	Yes		
CO Catalyst Installed	No	No	Yes	Yes		
Hours per Unit	11	73	130	425		
# Units Operating Simultaneously *	1	1	1	2		
Avg Load %	0	50	75	100		
NOx lb/hr	122	132	54	29		
CO lb/hr	4500	796	194	123		
VOC lb/hr	516	90	22	16		
MMBtu/hr - HHV	696	1373	1945	2379		
NOx lb/mmscf	179	98	28	12		
CO lb/mmscf	6621	594	102	53		
VOC lb/mmscf	759	67	12	7		
Total NOx lbs (2 units)	**2,684**	**19,272**	**14,040**	**24,650**	**60,646**	**30**
Total CO lbs (2 units)	**99,000**	**116,216**	**50,440**	**104,550**	**370,206**	**185**
Total VOC lbs (2 units)	**11,352**	**13,140**	**5,720**	**13,600**	**43,812**	**22**

*Assume this number of units operate simultaneously at condition stated with the remaining units operating at fully commissioned full output

Nat. Gas MMBtu/mmscf	1024	<- Summit to amend Siemens utilized fuel @ 23289 BTU/lb (HHV)
Number of GT Units	2	

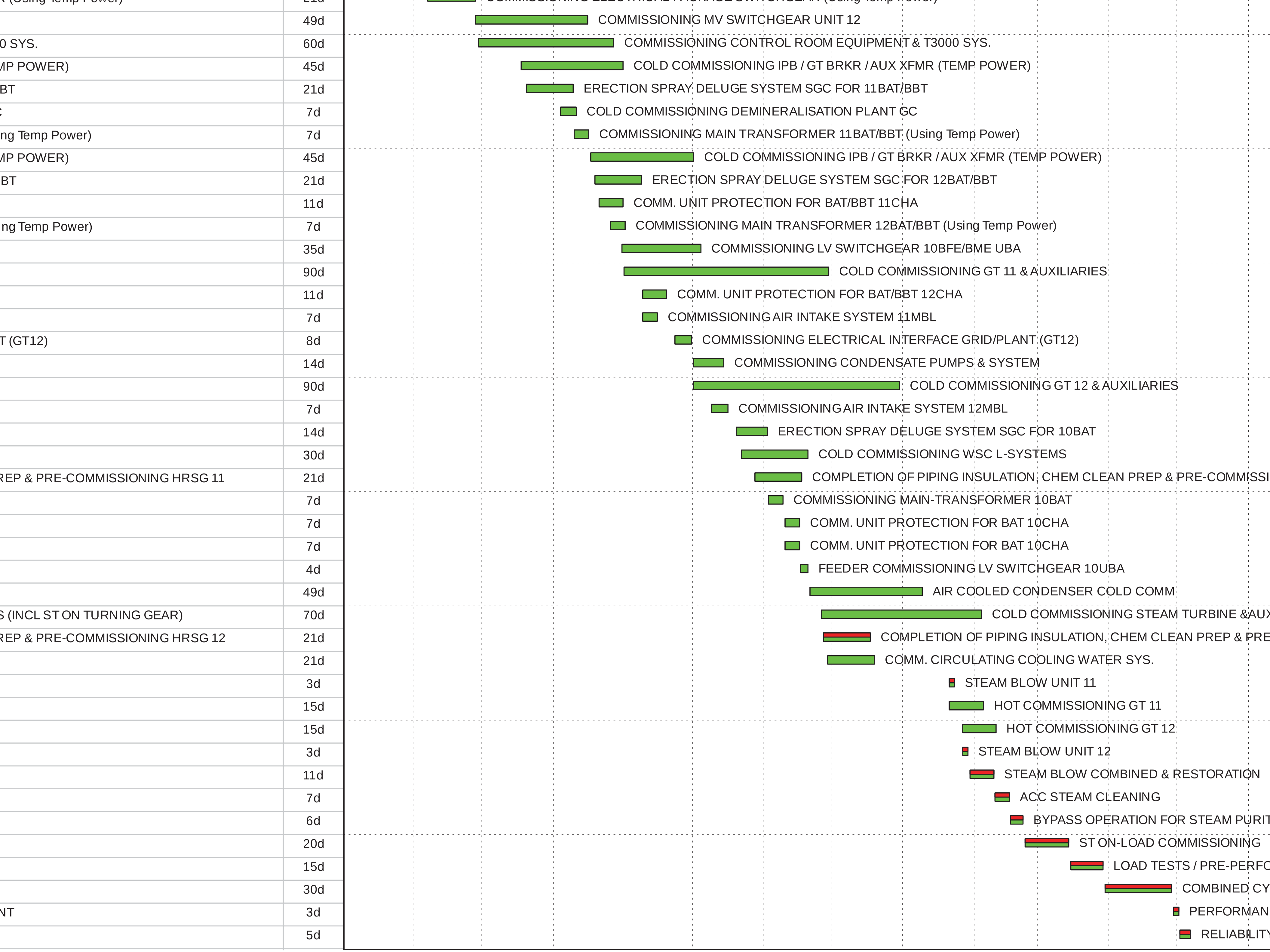
(A) CTG is assumed to ramp at 3 MW per minute during Commissioning Operations

(B) Duration variable based on water steam cycle flushing and chemical cleaning. Days with continuous 24-hour operation were assumed in order to reduce the number of starts (and hence emissions), during various tests.

(C) Following SCR installation, NO_X values based on reduction of 50% from 60-70% load and 88.2% from 70-100% load.

(D) Following oxidation catalyst installation, CO values based on reduction of 10% from 30-40% load, 20% from 40-50% load, 30% from 50-70% load, and 50% from 70-100% load.

(E) Following oxidation catalyst installation, VOC values based on reduction of 10% from 10-30% load and 20% from 30-50% load.



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T (GT12)
REP & PRE-COMMISSIONING HRSG 11
S (INCL ST ON TURNING GEAR)
REP & PRE-COMMISSIONING HRSG 12
NT
49d
60d
45d
21d
7d
7d
45d
21d
11d
7d
35d
90d
11d
7d
8d
14d
90d
7d
14d
30d
21d
7d
7d
7d
4d
49d
70d
21d
21d
3d
15d
15d
3d
11d
7d
6d
20d
15d
30d
3d
5d
COMMISSIONING MV SWITCHGEAR UNIT 12
COMMISSIONING CONTROL ROOM EQUIPMENT & T3000 SYS.
COLD COMMISSIONING IPB / GT BRKR / AUX XFMR (TEMP POWER)
ERECTION SPRAY DELUGE SYSTEM SGC FOR 11BAT/BBT
COLD COMMISSIONING DEMINERALISATION PLANT GC
COMMISSIONING MAIN TRANSFORMER 11BAT/BBT (Using Temp Power)
COLD COMMISSIONING IPB / GT BRKR / AUX XFMR (TEMP POWER)
ERECTION SPRAY DELUGE SYSTEM SGC FOR 12BAT/BBT
COMM. UNIT PROTECTION FOR BAT/BBT 11CHA
COMMISSIONING MAIN TRANSFORMER 12BAT/BBT (Using Temp Power)
COMMISSIONING LV SWITCHGEAR 10BFE/BME UBA
COLD COMMISSIONING GT 11 & AUXILIARIES
COMM. UNIT PROTECTION FOR BAT/BBT 12CHA
COMMISSIONING AIR INTAKE SYSTEM 11MBL
COMMISSIONING ELECTRICAL INTERFACE GRID/PLANT (GT12)
COMMISSIONING CONDENSATE PUMPS & SYSTEM
COLD COMMISSIONING GT 12 & AUXILIARIES
COMMISSIONING AIR INTAKE SYSTEM 12MBL
ERECTION SPRAY DELUGE SYSTEM SGC FOR 10BAT
COLD COMMISSIONING WSC L-SYSTEMS
COMPLETION OF PIPING INSULATION, CHEM CLEAN PREP & PRE-COMMISSI
COMMISSIONING MAIN-TRANSFORMER 10BAT
COMM. UNIT PROTECTION FOR BAT 10CHA
COMM. UNIT PROTECTION FOR BAT 10CHA
FEEDER COMMISSIONING LV SWITCHGEAR 10UBA
AIR COOLED CONDENSER COLD COMM
COLD COMMISSIONING STEAM TURBINE &AUX
COMPLETION OF PIPING INSULATION, CHEM CLEAN PREP & PRE
COMM. CIRCULATING COOLING WATER SYS.
STEAM BLOW UNIT 11
HOT COMMISSIONING GT 11
HOT COMMISSIONING GT 12
STEAM BLOW UNIT 12
STEAM BLOW COMBINED & RESTORATION
ACC STEAM CLEANING
BYPASS OPERATION FOR STEAM PURIT
ST ON-LOAD COMMISSIONING
LOAD TESTS / PRE-PERFO
COMBINED CY
PERFORMAN
RELIABILITY

Table 4.1A -10 Fuel Use Calculations

Turbines with Duct Firing

Fuel Type:	Nat Gas	# of Turbines:	2	
Btu/scf, HHV:	1024	# of DBs:	2	
Btu/lb, HHV:	23289	Duct Firing:	1500	max hrs/yr
SCF/lb:	22.743	No duct firing:	6500	max hrs/yr (1)
		Max daily hrs:	24	

Firing Cases:

1	Case 2, Cold day 23F, Baseload, with duct firing
2	Case 11, ISO day 64F, Baseload, no duct firing
3	Case 12, ISO day, 64F, Baseload, with duct firing

Case 2 used to establish maximum hourly and daily fuel use values.
Cases 11 and 12 used to establish maximum annual fuel use values.

Fuel Use Values per Turbine/DB

Case	**lbs/hr**	**scf/hr**	**scf/day**	**scf/yr**	**Est Annual Fuel Use, mmscf**	
2	105,934.00	2,409,274.34	57,822,584.20	NA		
11	95,385.00	2,169,356.70	52,064,560.90	14,100,818,576.66		
12	103,463.00	2,353,075.98	56,473,823.60	3,529,613,975.10		
		mmscf/hr	**mmscf/day**	**mmscf/yr**		
2		2.4093	57.8226	NA		
11		2.1694	52.0646	14,100.82		
12		2.3531	56.4738	3,529.61	17,630.43	1 Unit
					35,260.87	2 Units

Turbines without Duct Firing

Fuel Type:	Nat Gas	# of Turbines:	2	
Btu/scf, HHV:	1024	# of DBs:	0	
Btu/lb, HHV:	23289	Duct Firing:	0	max hrs/yr
SCF/lb:	22.743	No duct firing:	6500	max hrs/yr (1)
		Max daily hrs:	24	

Firing Cases:

1	Case 1, Cold day 23F, Baseload, without duct firing
2	Case 11, ISO day 64F, Baseload, without duct firing

Case 2 used to establish maximum hourly and daily fuel use values.
Cases 11 used to establish maximum annual fuel use values.

Fuel Use Values per Turbine w/o DB

Case	**lbs/hr**	**scf/hr**	**scf/day**	**scf/yr**	**Est Annual Fuel Use, mmscf**	
2	97,636.00	2,220,551.57	53,293,237.59	NA		
11	95,385.00	2,169,356.70	52,064,560.90	14,100,818,576.66		
	0.00	0.00	0.00	0.00		
		mmscf/hr	**mmscf/day**	**mmscf/yr**		
2		2.2206	53.2932	NA		
11		2.1694	52.0646	14,100.82		
		0.0000	0.0000	0.00	14,100.82	1 Unit
					28,201.64	2 Units

Attachment 4.1A-1

Parts 1 and 2

Turbine Performance Spec Sheets

2	2	2	2	2	2	2	2	2	2	2
13.1	10.1	16.4	16.7	18.1	13.0	10.0	14.6	16.3	17.7	11.9
5	5	5	5	5	5	5	5	5	5	5
12.2	9.3	15.2	15.4	16.8	12.0	9.3	13.5	15.1	16.4	11.0
2	2	2	2	2	2	2	2	2	2	2
8.0	6.2	10.0	10.2	11.0	7.9	6.1	8.9	9.9	10.8	7.2
1.0	1.0	1.0	1.0	2.2	1.0	1.0	1.0	1.0	2.2	1.0
2.3	1.8	2.9	3.0	6.8	2.3	1.8	2.6	2.9	6.8	2.1
1.1	0.9	1.4	1.4	1.5	1.1	0.9	1.2	1.3	1.5	1.0
8.0	8.0	9.7	9.7	11.7	8.0	8.0	8.8	9.5	11.5	8.0
,267	160,745	261,056	265,923	288,296	207,265	159,305	233,000	259,781	282,556	188,735

urposes only.
ion data upon request.

nt 4.1A-1 Part 1

	Case 01	Case 02	Case 03	Case 04	Case 05	Case 06	Case 07	Case 08	Case 09	Case 10	Case 11	Case 12	Case 13	Case 14	Case
%	Base Load	Base Load	75	50	Base Load	Base Load	Base Load	75	50	Base Load	Base Load	Base Load	75	50	Base
-	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x
-	New and Clean	New and Clean	New and Clean	New and Clean	New and Clean	New and Clean	New and Clean	New and Clean	New and Clean	New and Clean	New and Clean	New and Clean	New and Clean	New and Clean	New and
°F	23.0	23.0	23.0	23.0	59.0	59.0	59.0	59.0	59.0	64.0	64.0	64.0	64.0	64.0	98
%	92.0	92.0	92.0	92.0	60.0	60.0	60.0	60.0	60.0	40.0	40.0	40.0	40.0	40.0	17
psia	13.416	13.416	13.416	13.416	13.416	13.416	13.416	13.416	13.416	13.416	13.416	13.416	13.416	13.416	13.4
-	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Ga
Btu/lbm	20981	20981	20981	20981	20981	20981	20981	20981	20981	20981	20981	20981	20981	20981	209
-	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See not
°F	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60
-	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.
Hz	60	60	60	60	60	60	60	60	60	60	60	60	60	60	6
%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	ON	ON	OFF	OFF	OF
-	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	OF

kW	669,600	714,400	516,600	370,500	650,200	656,400	699,400	503,000	361,700	643,600	656,300	699,400	498,100	358,300	566,
Btu/kWhr LHV	6,120	6,230	6,390	6,910	6,110	6,100	6,210	6,330	6,820	6,110	6,100	6,210	6,330	6,820	6,1
kW	457,300	457,400	343,000	228,700	434,300	440,800	440,800	325,700	217,200	428,500	440,700	440,700	321,400	214,200	371,
kW	229,100	274,600	189,300	156,500	232,600	232,300	276,100	192,900	159,200	231,800	232,300	276,200	192,400	158,800	210,
kW	16,800	17,600	15,700	14,700	16,700	16,700	17,500	15,600	14,700	16,700	16,700	17,500	15,700	14,700	16,2

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Attachment 4.1A-1 Part 2 (2 pages)

	Case 18	Case 19	Case 20	Case 21	Case 22	Case 23	Case 24	Case 25	Case 26	Case 27	Case 28	Case 29
%	75	50	Base Load	Base Load	Base Load	75	MECL	MECL	MECL	MECL	MECL	Base Load
-	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1
-	New and Clean	New and Clean	New and Clean	New and Clean	New and Clean	New and Clean	New and Clean	New and Clean	New and Clean	New and Clean	New and Clean	New and Clean
°F	98.0	98.0	108.0	108.0	108.0	108.0	108.0	23.0	59.0	64.0	98.0	6.0
%	17.0	17.0	13.0	13.0	13.0	13.0	13.0	92.0	60.0	40.0	17.0	92.0
psia	13.416	13.416	13.416	13.416	13.416	13.416	13.416	13.416	13.416	13.416	13.416	13.416
-	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas
Btu/lbm	20981	20981	20981	20981	20981	20981	20981	20981	20981	20981	20981	20981
-	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]	See note [5&6]
°F	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
-	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Hz	60	60	60	60	60	60	60	60	60	60	60	60
%	0	0	0	0	0	0	0	0	0	0	0	0
-	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
-	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON

kW	440,500	317,900	533,800	620,000	664,300	414,600	313,200	312,700	318,800	319,300	316,700	719,800
Btu/kWhr LHV	6,520	7,060	6,300	6,240	6,360	6,640	7,140	7,240	7,050	7,030	7,070	6,250
kW	278,800	185,900	349,500	419,300	419,200	262,100	185,000	185,000	185,000	185,000	185,000	463,200
kW	176,900	146,400	200,200	217,300	262,400	167,500	142,600	142,000	148,200	148,700	146,100	274,200
kW	15,200	14,400	15,900	16,600	17,300	15,000	14,400	14,300	14,400	14,400	14,400	17,600

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is determined by
auxiliary loads
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d duct burners in
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Attachment 4.1A-2

Parts 1 and 2

Fire Pump and Emergency Generator

Spec Sheets

PERFORMANCE DATA[DM8761]

May 29, 2012

Performance Number: DM8761 **Change Level: 03**

SALES MODEL:	3512C	COMBUSTION:	DI
ENGINE POWER (BHP):	1,853	ENGINE SPEED (RPM):	1,800
GEN POWER WITH FAN (EKW):	1,250.0	HERTZ:	60
COMPRESSION RATIO:	14.7	FAN POWER (HP):	88.5
APPLICATION:	PACKAGED GENSET	ASPIRATION:	TA
RATING LEVEL:	STANDBY	AFTERCOOLER TYPE:	ATAAC
PUMP QUANTITY:	1	AFTERCOOLER CIRCUIT TYPE:	JW+OC, ATAAC
FUEL TYPE:	DIESEL	INLET MANIFOLD AIR TEMP (F):	114
MANIFOLD TYPE:	DRY	JACKET WATER TEMP (F):	210.2
GOVERNOR TYPE:	ADEM3	TURBO CONFIGURATION:	PARALLEL
ELECTRONICS TYPE:	ADEM3	TURBO QUANTITY:	4
CAMSHAFT TYPE:	STANDARD	TURBOCHARGER MODEL:	GTB4708BN-52T-0.96
IGNITION TYPE:	CI	CERTIFICATION YEAR:	2009
INJECTOR TYPE:	EUI	PISTON SPD @ RATED ENG SPD (FT/MIN):	2,244.1
FUEL INJECTOR:	2664387		
REF EXH STACK DIAMETER (IN):	10		
MAX OPERATING ALTITUDE (FT):	6,562		

General Performance Data

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP
EKW	%	BHP	PSI	LB/BHP-HR	GAL/HR	IN-HG	DEG F	DEG F	IN-HG	DEG F
1,250.0	100	1,853	258	0.341	90.1	69.3	114.5	1,082.4	65.6	715.7
1,125.0	90	1,677	234	0.345	82.7	64.0	111.7	1,054.7	60.0	701.7
1,000.0	80	1,500	209	0.349	74.9	57.5	109.0	1,026.0	53.7	690.2
937.5	75	1,412	197	0.351	70.8	53.8	107.8	1,011.2	50.2	685.5
875.0	70	1,324	184	0.353	66.7	49.9	107.0	996.2	46.5	682.0
750.0	60	1,147	160	0.355	58.2	40.8	107.5	964.3	38.5	686.3
625.0	50	971	135	0.358	49.7	31.6	108.3	928.4	30.7	686.8
500.0	40	794	111	0.364	41.3	23.3	107.7	878.9	23.9	675.6
375.0	30	618	86	0.377	33.3	16.4	106.1	802.6	18.4	644.9
312.5	25	530	74	0.387	29.3	13.4	105.3	756.0	16.1	621.9
250.0	20	441	61	0.403	25.4	10.6	104.4	703.7	14.0	593.7
125.0	10	265	37	0.468	17.7	6.3	102.8	572.2	10.6	497.4

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
EKW	%	BHP	IN-HG	DEG F	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
1,250.0	100	1,853	74	417.6	4,277.1	9,808.5	18,861.2	19,492.2	4,102.9	3,733.7
1,125.0	90	1,677	68	398.5	4,081.9	9,211.1	17,949.9	18,528.9	3,899.6	3,557.0
1,000.0	80	1,500	62	374.5	3,832.1	8,521.5	16,789.5	17,313.6	3,643.7	3,329.8
937.5	75	1,412	58	360.8	3,687.5	8,145.0	16,120.5	16,616.3	3,497.0	3,198.2
875.0	70	1,324	54	345.8	3,527.7	7,745.8	15,384.7	15,851.6	3,335.8	3,052.7
750.0	60	1,147	44	310.6	3,140.0	6,873.7	13,642.6	14,050.1	2,949.1	2,700.5
625.0	50	971	34	273.1	2,737.8	5,975.5	11,849.5	12,197.2	2,562.6	2,349.1
500.0	40	794	26	236.3	2,366.0	5,105.5	10,205.3	10,494.6	2,211.1	2,031.3
375.0	30	618	19	201.6	2,047.8	4,290.5	8,810.7	9,043.5	1,909.9	1,761.8
312.5	25	530	16	184.7	1,905.8	3,899.6	8,192.6	8,397.6	1,772.8	1,639.8
250.0	20	441	13	168.3	1,775.2	3,520.0	7,627.9	7,805.5	1,642.9	1,524.7
125.0	10	265	8	142.5	1,585.3	2,839.9	6,801.3	6,925.3	1,458.9	1,367.6

Heat Rejection Data

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHUAST RECOVERY TO 350F	FROM OIL COOLER	FROM AFTERCOOLER	WORK ENERGY	LOW HEAT VALUE ENERGY	HIGH HEAT VALUE ENERGY
EKW	%	BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN
1,250.0	100	1,853	31,576	6,514	65,110	29,759	10,304	23,510	78,581	193,456	206,079
1,125.0	90	1,677	29,734	6,270	60,204	27,143	9,452	21,032	71,098	177,455	189,034
1,000.0	80	1,500	27,726	6,037	54,953	24,489	8,557	18,207	63,615	160,654	171,136
937.5	75	1,412	26,663	5,923	52,223	23,157	8,095	16,680	59,874	151,991	161,909
875.0	70	1,324	25,559	5,808	49,422	21,848	7,624	15,063	56,133	143,145	152,486
750.0	60	1,147	23,229	5,569	43,689	19,616	6,655	11,479	48,650	124,950	133,103
625.0	50	971	20,792	5,328	37,871	17,045	5,680	8,052	41,167	106,635	113,593
500.0	40	794	18,283	4,989	31,968	14,150	4,726	5,314	33,685	88,727	94,517
375.0	30	618	15,693	4,533	26,028	10,994	3,802	3,354	26,202	71,391	76,049
312.5	25	530	14,356	4,306	23,064	9,385	3,349	2,590	22,460	62,878	66,981
250.0	20	441	12,992	4,089	20,111	7,793	2,901	1,968	18,719	54,468	58,022
125.0	10	265	10,085	3,727	14,275	4,131	2,024	1,065	11,236	37,992	40,472

Regulatory Information

EPA TIER 2		2006 - 2010		
GASEOUS EMISSIONS DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 89 SUBPART D AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. GASEOUS EMISSIONS VALUES ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS.				
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
U.S. (INCL CALIF)	EPA	NON-ROAD	TIER 2	CO: 3.5 NOx + HC: 6.4 PM: 0.20

EPA EMERGENCY STATIONARY		2011 - ----		
GASEOUS EMISSIONS DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 60 SUBPART IIII AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. GASEOUS EMISSIONS LIMIT VALUES ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS.				
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
U.S. (INCL CALIF)	EPA	STATIONARY	EMERGENCY STATIONARY	CO: 3.5 NOx + HC: 6.4 PM: 0.20

Altitude Derate Data

ALTITUDE CORRECTED POWER CAPABILITY (BHP)

AMBIENT OPERATING TEMP (F)	50	60	70	80	90	100	110	120	130	NORMAL
ALTITUDE (FT)										
0	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853
1,000	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853
2,000	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853
3,000	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853
4,000	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853
5,000	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,853	1,825	1,853
6,000	1,853	1,853	1,853	1,853	1,853	1,848	1,815	1,784	1,754	1,853
7,000	1,853	1,853	1,853	1,841	1,807	1,775	1,744	1,714	1,685	1,853
8,000	1,853	1,836	1,801	1,767	1,735	1,704	1,674	1,646	1,618	1,853
9,000	1,796	1,762	1,728	1,696	1,666	1,636	1,607	1,579	1,553	1,809
10,000	1,723	1,690	1,658	1,628	1,598	1,569	1,542	1,515	1,490	1,748
11,000	1,653	1,621	1,590	1,561	1,532	1,505	1,479	1,453	1,429	1,688
12,000	1,584	1,554	1,524	1,496	1,469	1,443	1,417	1,393	1,369	1,630
13,000	1,518	1,489	1,461	1,434	1,408	1,382	1,358	1,335	1,312	1,573
14,000	1,454	1,426	1,399	1,373	1,348	1,324	1,301	1,278	1,257	1,517
15,000	1,392	1,365	1,339	1,314	1,290	1,267	1,245	1,224	1,203	1,463

Performance Parameter Reference

Parameters Reference:DM9600-05
PERFORMANCE DEFINITIONS

PERFORMANCE DEFINITIONS DM9600

APPLICATION:
Engine performance tolerance values below are representative of a typical production engine tested in a calibrated dynamometer test cell at SAE J1995 standard reference conditions. Caterpillar maintains ISO9001:2000 certified quality management systems for engine test Facilities to assure accurate calibration of test equipment. Engine test data is corrected in accordance with SAE J1995. Additional reference material SAE J1228, J1349, ISO 8665, 3046-1:2002E, 3046-3:1989, 1585, 2534, 2288, and 9249 may apply in part or are similar to SAE J1995. Special engine rating request(SERR)test data shall be noted.

PERFORMANCE PARAMETER TOLERANCE FACTORS:
Power +/- 3%
Torque +/- 3%
Exhaust stack temperature +/- 8%
Inlet airflow +/- 5%
Intake manifold pressure-gage +/- 10%
Exhaust flow +/- 6%
Specific fuel consumption +/- 3%
Fuel rate +/- 5%
Heat rejection +/- 5%
Heat rejection exhaust only +/- 10%

Torque is included for truck and industrial applications, do not use for Gen Set or steady state applications.

On C7 - C18 engines, at speeds of 1100 RPM and under these values are provided for reference only, and may not meet the tolerance listed.

These values do not apply to C280/3600. For these models, see the tolerances listed below.

C280/3600 HEAT REJECTION TOLERANCE FACTORS:
Heat rejection +/- 10%
Heat rejection to Atmosphere +/- 50%
Heat rejection to Lube Oil +/- 20%
Heat rejection to Aftercooler +/- 5%

TEST CELL TRANSDUCER TOLERANCE FACTORS:

Torque +/- 0.5%
Speed +/- 0.2%
Fuel flow +/- 1.0%
Temperature +/- 2.0 C degrees
Intake manifold pressure +/- 0.1 kPa

OBSERVED ENGINE PERFORMANCE IS CORRECTED TO SAE J1995 REFERENCE AIR AND FUEL CONDITIONS.

REFERENCE ATMOSPHERIC INLET AIR

FOR 3500 ENGINES AND SMALLER
SAE J1228 reference atmospheric pressure is 100 KPA (29.61 in hg) and standard temperature is 25 (77) at 60% relative humidity.

FOR 3600 ENGINES
Engine rating obtained and presented in accordance with ISO 3046/1 and SAE J1995 JAN90 standard reference conditions of 25, 100 KPA 30% relative humidity and 150M altitude at the stated aftercooler water temperature.

MEASUREMENT LOCATION FOR INLET AIR TEMPERATURE
Location for air temperature measurement air cleaner inlet at stabilized operating conditions.

PERFORMANCE DATA[DM8761]

REFERENCE EXHAUST STACK DIAMETER
The Reference Exhaust Stack Diameter published with this dataset is only used for the calculation of Smoke Opacity values displayed in this dataset. This value does not necessarily represent the actual stack diameter of the engine due to the variety of exhaust stack adapter options available. Consult the price list, engine order or general dimension drawings for the actual stack diameter size ordered or options available.

REFERENCE FUEL

DIESEL
Reference fuel is #2 distillate diesel with a 35API gravity;
A lower heating value is 42,780 KJ/KG (18,390 BTU/LB) when used at 29 (84.2), where the density is 838.9 G/Liter (7.001 Lbs/Gal).

GAS
Reference natural gas fuel has a lower heating value of 33.74 KJ/L (905 BTU/CU Ft). Low BTU ratings are based on 18.64 KJ/L (500 BTU/CU FT) lower heating value gas. Propane ratings are based on 87.56 KJ/L (2350 BTU/CU Ft) lower heating value gas.

ENGINE POWER (NET) IS THE CORRECTED FLYWHEEL POWER (GROSS) LESS EXTERNAL AUXILIARY LOAD
Engine corrected gross output includes the power required to drive standard equipment; lube oil, scavenge lube oil, fuel transfer, common rail fuel, separate circuit aftercooler and jacket water pumps. Engine net power available for the external (flywheel) load is calculated by subtracting the sum of auxiliary load from the corrected gross flywheel out put power. Typical auxiliary loads are radiator cooling fans, hydraulic pumps, air compressors and battery charging alternators.

ALTITUDE CAPABILITY
Altitude capability is the maximum altitude above sea level at standar d temperature and standard pressure at which the engine could develop full rated output power on the current performance data set. Standard temperature values versus altitude could be seen on TM2001.

Engines with ADEM MEUI and HEUI fuel systems operating at conditions above the defined altitude capability derate for atmospheric pressure and temperature conditions outside the values defined, see TM2001. Mechanical governor controlled unit injector engines require a setting change for operation at conditions above the altitude defined on the engine performance sheet. See your Caterpillar technical representative for non standard ratings.

REGULATIONS AND PRODUCT COMPLIANCE
TMI Emissions information is presented at 'nominal' and 'not to exceed' values for standard ratings. No tolerances are applied to the emissions data. These values are subject to change at any time. The controlling federal and local emission requirements need to be verified by your Caterpillar technical representative. Log on to the Technology and Solutions Divisions (T&SD) web page (http://tsd.cat.com/etsd/index.cfm?tech_id=2635ICAL) for information including federal regulation applicability and time lines for implementation. Information for labeling and tagging requirements is also provided.

NOTES:
Regulation watch covers regulations in effect and future regulation ch anges for world, federal, state and loca. This page includes items on the watch list where a regulation change or product change might be pending and may need attention of the engine product group. For additional emissions information log on to the TMI web page.

Additional product information for specific market application is available.
Customer's may have special emission site requirements that need to be verified by the Caterpillar Product Group engineer.

HEAT REJECTION DEFINITIONS:
Diesel Circuit Type and HHV Balance : DM9500

EMISSIONS DEFINITIONS:
Emissions : DM1176

SOUND DEFINITIONS:

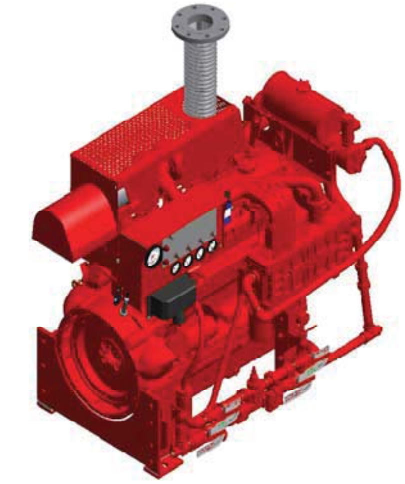
MODELS

JU6H-UFD0 JU6H-UFD2 JU6H-UF30 JU6H-UF32 JU6H-UF34 JU6H-UFM8 JU6H-UFM0 JU6H-UFM2 JU6H-UF58 JU6H-UF50 JU6H-UF52 JU6H-UF54 JU6H-UF60 JU6H-UF62 JU6H-UFAAQ8 JU6H-UFAAPG JU6H-UFAARG JU6H-UF84 JU6H-UFAAS0

FM-UL-cUL APPROVED RATINGS BHP/*KW*

Attachment 4.1A-2 Part 2

JU6H MODEL ♦	RATED SPEED 1470	1760	2100	2350	2600	2800	3000	US-EPA (NSPS) Available Until ●
UFD0		**110** *82*	**144** *107*	**148** *110*				*12/31/09*
UFD2				**148** *110*	**148** *110*			*12/31/09*
UF30	**94** *70*	**140** *104*	**160** *119*	**160** *119*				*12/31/09*
UF32				**160** *119*	**160** *119*			*12/31/09*
UF34						**160** *119*	**175** *131*	*12/31/11* ▲ *12/31/12* ▼+
UFM8	**136** *101*	**175** *131*						*12/31/09*
UFM0		**175** *131*	**207** *154*	**200** *149*				*12/31/08*
UFM2				**200** *149*	**200** *149*			*12/31/08*
UF58	**138** *103*	**183** *137*						*12/31/08*
UF50		**183** *137*	**210** *157*	**210** *157*				*12/31/08*
UF52				**210** *157*	**210** *157*			*12/31/08*
UF54						**216** *161*	**216** *161*	*12/31/11*
UFAAPG	**220** *164*							*N/A λ*
UFAAQ8		**227** *169*						*N/A λ*
UF60		**200** *149*	**240** *179*	**240** *179*				*12/31/08*
UF62				**240** *179*	**240** *179*			*12/31/08*
UFAARG		**252** *188*						*N/A λ*
UF84						**259** *193*	**275** *205*	*12/31/11*
UFAAS0			**260** *194*					*N/A λ*



Picture shown represents TRWA engine model

● USA EPA (NSPS) Emissions Compliant. Applies to John Deere model year per Table 4 of 40 CFR Part 60 Sub Part IIII.

♦ All Models are available for Export

λ N/A = Not Applicable / Non-Emissionized

+ Not Available in California

▼ Less than 175 HP

▲ Greater than 174 HP

SPECIFICATIONS

<table>
<tr><th rowspan="2">ITEM</th><th colspan="18">JU6H MODELS</th></tr>
<tr><th>D0</th><th>D2</th><th>30</th><th>32</th><th>34</th><th>M8</th><th>M0</th><th>M2</th><th>58</th><th>50</th><th>52</th><th>54</th><th>60</th><th>62</th><th>AAQ8</th><th>PG</th><th>AARG/S0</th><th>84</th></tr>
<tr><td>Number of Cylinders</td><td colspan="18">6</td></tr>
<tr><td>Aspiration</td><td colspan="12">T</td><td colspan="6">TRWA</td></tr>
<tr><td>Rotation*</td><td colspan="18">CW</td></tr>
<tr><td>Overall Dimensions – in. (mm)</td><td colspan="12">57 (1458) L x 37 (931) W x 46” (1164) H</td><td colspan="6">58 (1474) L x 37 (931) W x 46” (1164) H</td></tr>
<tr><td>Crankshaft Centerline Height - in. (mm)</td><td colspan="18">14 (356)</td></tr>
<tr><td>Weight – lb (kg)</td><td colspan="12">1657 (750)</td><td colspan="6">1693 (766)</td></tr>
<tr><td>Compression Ratio</td><td colspan="18">17.0:1</td></tr>
<tr><td>Displacement – cu. in. (L)</td><td colspan="18">414 (6.8)</td></tr>
<tr><td>Engine Type</td><td colspan="18">4 Stroke Cycle – Inline Construction</td></tr>
<tr><td>Bore & Stroke – in. (mm)</td><td colspan="18">4.19 x 5.00 (106 x 127)</td></tr>
<tr><td>Installation Drawing</td><td colspan="18">D536</td></tr>
<tr><td>Wiring Diagram AC</td><td colspan="18">C07591</td></tr>
<tr><td>Wiring Diagram DC</td><td colspan="18">C071612</td></tr>
<tr><td>Engine Series</td><td colspan="18">John Deere 6068 Series</td></tr>
<tr><td>Speed Interpolation</td><td colspan="18">Optional</td></tr>
</table>

Abbreviations: CW – Clockwise T – Turbocharged TRWA – Turbocharged with Raw Water Aftercooling L - Length W – Width H - Height
*Rotation viewed from Heat Exchanger / Front of engine

CERTIFIED POWER RATING

- Each engine is factory tested to verify power and performance.
- Although FM-UL ratings are shown at specific speeds, Clarke engines can be applied at any intermediate speed. To determine the intermediate speed power; make a linear interpolation from the Clarke FM-UL power curve. Contact Clarke or your Pump OEM Representative to obtain details.

c UL us   Meets NFPA 20 Requirements   FM c us APPROVED

ENGINE RATINGS BASELINES

- Engines are to be used for stationary emergency standby fire pump service only. Engines are to be tested in accordance with NFPA 25.
- Engines are rated at standard SAE conditions of 29.61 in. (752.1 mm) Hg barometer and 77°F (25°C) inlet air temperature [approximates 300 ft. (91.4 m) above sea level] by the testing laboratory (see SAE Standard J 1349).
- A deduction of 3 percent from engine horsepower rating at standard SAE conditions shall be made for diesel engines for each 1000 ft. (305 m) altitude above 300 ft. (91.4 m)
- A deduction of 1 percent from engine horsepower rating as corrected to standard SAE conditions shall be made for diesel engines for every 10°F (5.6°C) above 77°F (25°C) ambient temperature.

ENGINE EQUIPMENT

EQUIPMENT	STANDARD	OPTIONAL
Air Cleaner	Direct Mounted, Washable, Indoor Service with Drip Shield	Disposable, Drip Proof, Indoor Service Outdoor Type, Single or Two Stage (Cyclonic)
Alarms	Overspeed Alarm & Shutdown, Low Oil Pressure, Low & High Coolant Temperature, Low Raw Water Flow, High Raw Water Temperature	
Alternator	12V-DC, 42 Amps with Poly-Vee Belt and Guard	24V-DC, 40 Amps with Poly-Vee Belt and Guard
Coupling	Bare Flywheel	Listed Driveshaft and Guard, UFD0/D2/30/32/34 – CDS20-S1; UFM8/M0/M2/58/50/52/54/60/62/84 – CDS30-S1; AAPG/AAQ8/AARG/AAS0 – CDS50-SC
Exhaust Flex Connection	Stainless Steel Flex, 150# ANSI Flanged Connection, 5”	Stainless Steel Flex, 150# ANSI Flanged Connection, 6”
Exhaust Protection	Metal Guards on Manifolds and Turbocharger	
Flywheel Housing	SAE #3	
Flywheel Power Take Off	11.5” SAE Industrial Flywheel Connection	
Fuel Connections	Fire Resistant, Flexible, USA Coast Guard Approved, Supply and Return Lines	Stainless Steel, Braided, cUL Listed, Supply and Return Lines
Fuel Filter	Primary Filter with Priming Pump	
Fuel Injection System	Stanadyne, Direct Injection	
Engine Heater	115V-AC, 1360 Watt	230V-AC, 1360 Watt
Governor, Speed	Constant Speed, Mechanical	
Heat Exchanger	Tube and Shell Type, 60 PSI (4 BAR), NPT(F) Connections – Sea Water Compatible	
Instrument Panel	English and Metric, Tachometer, Hourmeter, Water Temperature, Oil Pressure and Two (2) Voltmeters	
Junction Box	Integral with Instrument Panel; For DC Wiring Interconnection to Engine Controller	
Lube Oil Cooler	Engine Water Cooled, Plate Type	
Lube Oil Filter	Full Flow with By-Pass Valve	
Lube Oil Pump	Gear Driven, Gear Type	
Manual Start Control	On Instrument Panel with Control Position Warning Light	
Overspeed Control	Electronic with Reset and Test on Instrument Panel	
Run – Stop Control	On Instrument Panel with Control Position Warning Light	
Raw Water Cooling Loop – w\Alarms	Galvanized	Seawater, All 316SS, High Pressure
Raw Water Cooling Loop – Solenoid Operation	Automatic from Fire Pump Controller and from Engine Instrument Panel (for Horizontal Fire Pump Applications)	Not Supplied (for Vertical Turbine Fire Pump Applications)
Run Solenoid	12V-DC Energized to Stop (ETS)	12V-DC Energized to Run (ETR); 24V-DC Energized to Run (ETR); 24V-DC Energized to Stop (ETS)
Starters	Two (2) 12V-DC	Two (2) 24V-DC
Throttle Control	Adjustable Speed Control, Tamper Proof	
Water Pump	Centrifugal Type, Poly-Vee Belt Drive with Guard	

Abbreviations :DC – Direct Current, AC – Alternating Current, SAE – Society of Automotive Engineers, NPT(F) – National Pipe Tapered Thread (Female) SS – Stainless Steel

MODEL NOMENCLATURE (10 Digit Models)

J U 6 H UF A ARG

- John Deere Base Engine (J)
- 350 Series (U)
- 6 Cylinder (6)
- Heat Exchanger Cooled (H)
- UL Listed and FM Approved (UF)
- Built in USA (A)
- Non-Emissionized / Power Curve Number (ARG)

MODEL NOMENCLATURE (8 Digit Models)

J U 6 H - UF 54

- John Deere Base Engine (J)
- 350 Series (U)
- 6 Cylinder (6)
- Heat Exchanger Cooled (H)
- UL Listed and FM Approved (UF)
- Power Curve Number (54)

CLARKE®

CLARKE Fire Protection Products, Inc.
100 Progress Place, Cincinnati, Ohio 45246
United States of America
Tel +1-513-475-(FIRE)3473 Fax +1-513-771-8930
www.clarkefire.com

CLARKE UK, Ltd.
Grange Works, Lomond Rd., Coatbridge, ML5-2NN
United Kingdom
Tel +44-1236-429946 Fax +44-1236-427274
www.clarkefire.com

Attachment 4.1A-3

Part 1

Auxiliary Boiler Spec Sheets

BOILER PREDICTED PERFORMANCE*

CleaverBrooks

Version: NB-Size-2014.0.1

Customer: Siemens
Engineer: Skiles
Proposal: TBD
Fuel: Birmingham
Model: NB-300D-65
Design Pressure: 250 PSIG

June 1, 2015

Boiler load - %	100%	75%	50%	25%							
Steam Flow - Gross Production	70,000	52,500	35,000	17,500							Lb/Hr
Net Steam Flow - Gross less Pegging Steam	70,000	52,500	35,000	17,500							Lb/Hr
Pegging Steam	-	-	-	-							Lb/Hr
Steam Pressure - Operating	125	125	125	125							PSIG
Steam Temperature	353	353	353	353							°F
Fuel Input (HHV)	84.2	62.9	41.8	20.9							MMBTU/Hr
Ambient Air Temperature	70	70	70	70							°F
Relative Humidity	60	60	60	60							%
Excess Air	25	25	25	25							%
Flue Gas Recirculation	25	25	25	25							%
Steam Output Duty	69.9	52.4	35.0	17.5							MMBTU/hr
Heat Release Rate - Volumetric	65,504	48,894	32,493	16,284							BTU/FT3-Hr
Heat Release Rate - Area	109,446	81,695	54,290	27,208							BTU/FT2-Hr
Heat Flux	14,580	10,935	7,290	3,645							BTU/FT2-Hr
Feed Water Temperature	227	227	227	227							°F
Water Temperature Leaving Economizer	314	301	288	276							±10°F
Blow Down	1.0	1.0	1.0	1.0							%
Boiler Gas Exit Temperature	532	481	429	382							±10°F
Economizer Gas Exit Temperature	305	285	267	251							±10°F
Air Flow	76,629	57,198	38,011	19,049							Lb/Hr
Flue Gas to Stack	80,489	60,080	39,926	20,009							Lb/Hr
Flue Gas Including FGR	100,611	75,100	49,908	25,011							Lb/Hr
Fuel Flow	3,860	2,881	1,914	959							Lb/Hr
Flue Gas Analysis,Losses,Efficiency - %											
Dry Gas Loss	4.8	4.4	4.0	3.7							%
Air Moisture Loss	0.1	0.1	0.1	0.1							%
Fuel Moisture Loss	10.8	10.7	10.6	10.5							%
Casing Loss	0.3	0.4	0.6	1.2							%
Margin	1.0	1.0	1.0	1.0							%
Efficiency - LHV	92.0	92.4	92.7	92.5							%
Efficiency - HHV	83.0	83.4	83.7	83.5							%
Total Pressure Drop Including Economizer	9.06	5.04	2.23	0.59							IN WC
Products of Combustion - CO2	7.72	7.72	7.72	7.72							% vol.
- H2O	16.39	16.39	16.39	16.39							% vol.
-N2	72.08	72.08	72.08	72.08							% vol.
-O2	3.81	3.81	3.81	3.81							% vol.
-SO2	0.00	0.00	0.00	0.00							% vol.

Fuel Composition - Gas			BOILER SURFACE AREAS-ft2		
methane	90	% vol.	Furnace Volume:	1,285	ft3
ethane	5	% vol.	Furnace Projected Area:	769	ft2
nitrogen	5	% vol.	Evaporator:	3,819	ft2
hydrogen sulfide	0.0001	% vol.	Total Area:	4,588	ft2
			Economizer:	9,237	ft2
LHV-Btu/lb	19687		Superheater:	-	ft2
HHV-Btu/lb	21815				

Above data is predicted only, see proposal for guaranteed numbers.

APPENDIX 4.1B
MODELING SUPPORT DATA

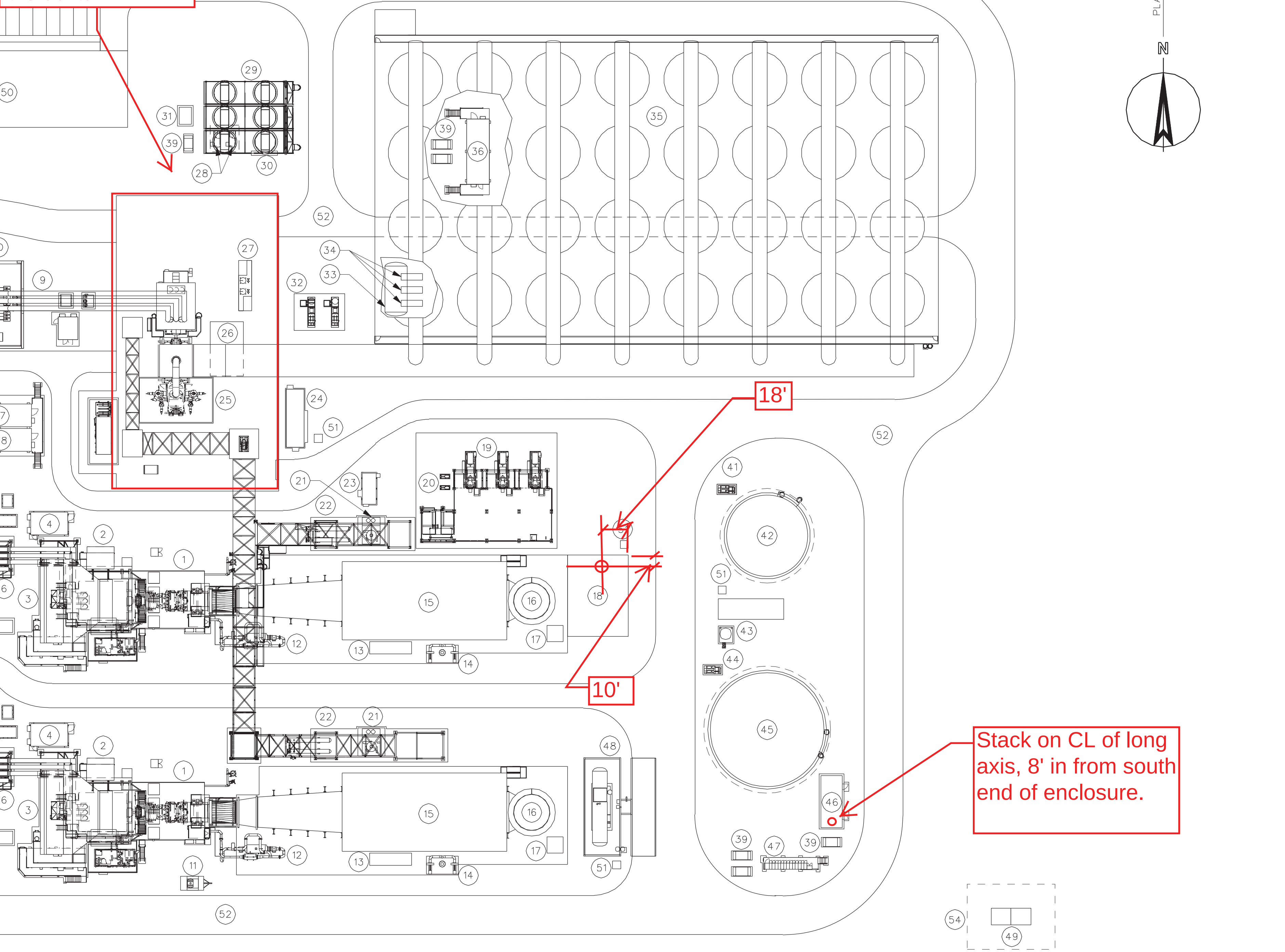
APPENDIX 4.1B

Modeling Support Data

This appendix contains the following data and figures:

4.1B-1	Facility Plot Plan
4.1B-2a-2b-2c	Site Layout
4.1B-3a-3b	Facility Elevation Views
4.1B-4a-4e	Wind Rose Figures (5)
4.1B-5	AVAQMD (MDAB) Air Monitoring Station Map
4.1B-6	Turbine Screening Modeling
4.1B-7	Refined Modeling Stack Parameters and Emission Rates

Modeling input/output files are included in the enclosed CD's.



2. ROTOR AIR CO
PRE-ENGINEERI
COOLER PIPINC
3. CLOSED COOL
COOLING BALA
GENERATOR OI
4. REFERENCE DF
EQUIPMENT IDE

LEGEND

1 UMB
2 MKJ
3 MBL
4 CJT
5 UBA03-04
6 BAC
7 BBT
8 BAT
9 BAA
10 UBH
11 MBY
12 MBH
13 EKT
14 HSK
15 UHA
16 UHN
17 CFE
18 UHB
19 LAC
20 LCN
21 UHW
22 EKC
23 QU
24 USV
25 UMA/MKA02
26 MAL
27 SCA
28 PGB
29 URB
30 URX
31 UBA05
32 MAJ
33 ULC
34 LCB
35 URC
36 UBA06
37 UBA07
38 UBA08
39 BFT
40 XKA
41 UGX
42 UGC
43 UGD/GCB
44 GAF
45 UGA/UGF
46 USG
47 UBA09
48 UTR
49 EKE
50 UCA/UST/UYC
51 UYX
52 UZA
53 UZD
54 UZJ

Figure 4.1B-1 Plot Plan

0 5 10 20 30 50
SCALE IN METERS
0 10 20 50 100 200

Original		
Project	SUMM	
	Date	Name
Drawn	15 / 04 / 13	D. STULLENBURGER
Coord.	15 / 04 / 13	A. IQBAL

Figure 4.1B-2a

See Drawing File GH99090101_R1

Figure 4.1B-2b

See Drawing File GH99100101_R1

Figure 4.1B-2c

See Drawing File SKH99110101_R1

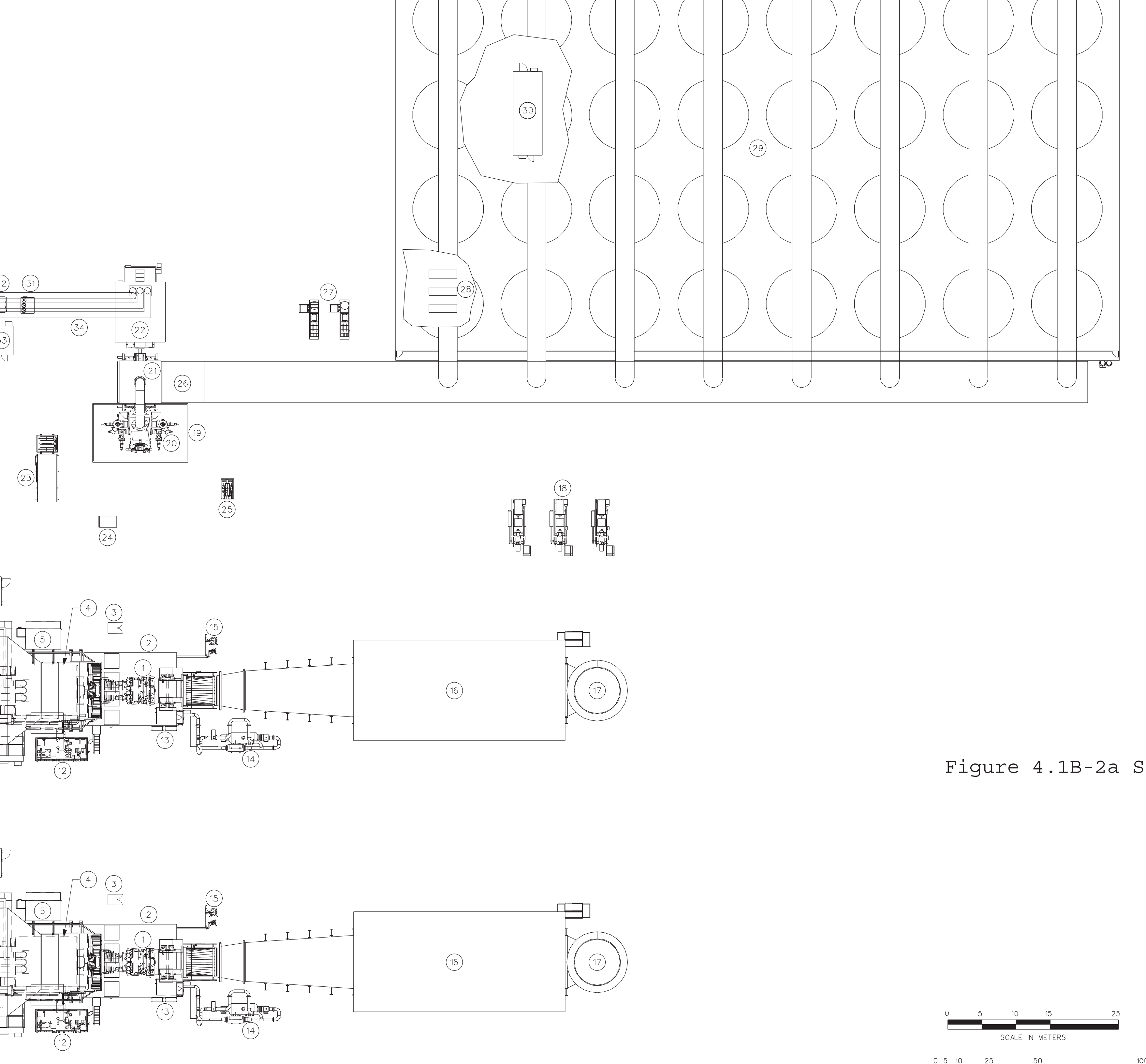


Figure 4.1B-2a Site Layout

NOTES

1. THE EQUIPMENT SHO
THIS DESIGN IS SUB
OF SIEMENS ENERGY

2. ROTOR AIR COOLER
PRE-ENGINEERED PIF
COOLER PIPING STR

LEGEND

1	MB	GAS
2	UMB	GAS
3	MBX01	HYDR
4	MKA01/02	GAS
5	MKJ	GT C
6	CJT	SEE/
7	MKC01	GT S
8	MBJ	SFC
9	MBL	TURE
10	MBX02	INLET
11	UBA01-02	ELEC
12	MBV	LUBE
13	SGL	FM2C
14	MBH	ROTC
15	MBP	FUEL
16	UHA	HEAT
17	UHN	HRSC
18	LAC	BOIL
19	UMA	STEA
20	MAA/MAB	HP/II
21	MAC	LP S
22	MKA03	STEA
23	MAV	ST L
24	MAX	ST H
25	MAW	GLAN
26	MAG	HOT
27	MAJ	VACU
28	LCB	COND
29	URC	AIR C
30	UBA06	ACC
31	BAB	VT 8
32	MKC02	SEE
33	CJN	ST S
34	BAA	ISOP

Original		
Project	SUMM	
	Date	Name
Drawn	15 / 04 / 13	D. STULLENBURGER
Coord.	15 / 04 / 13	A. IQBAL

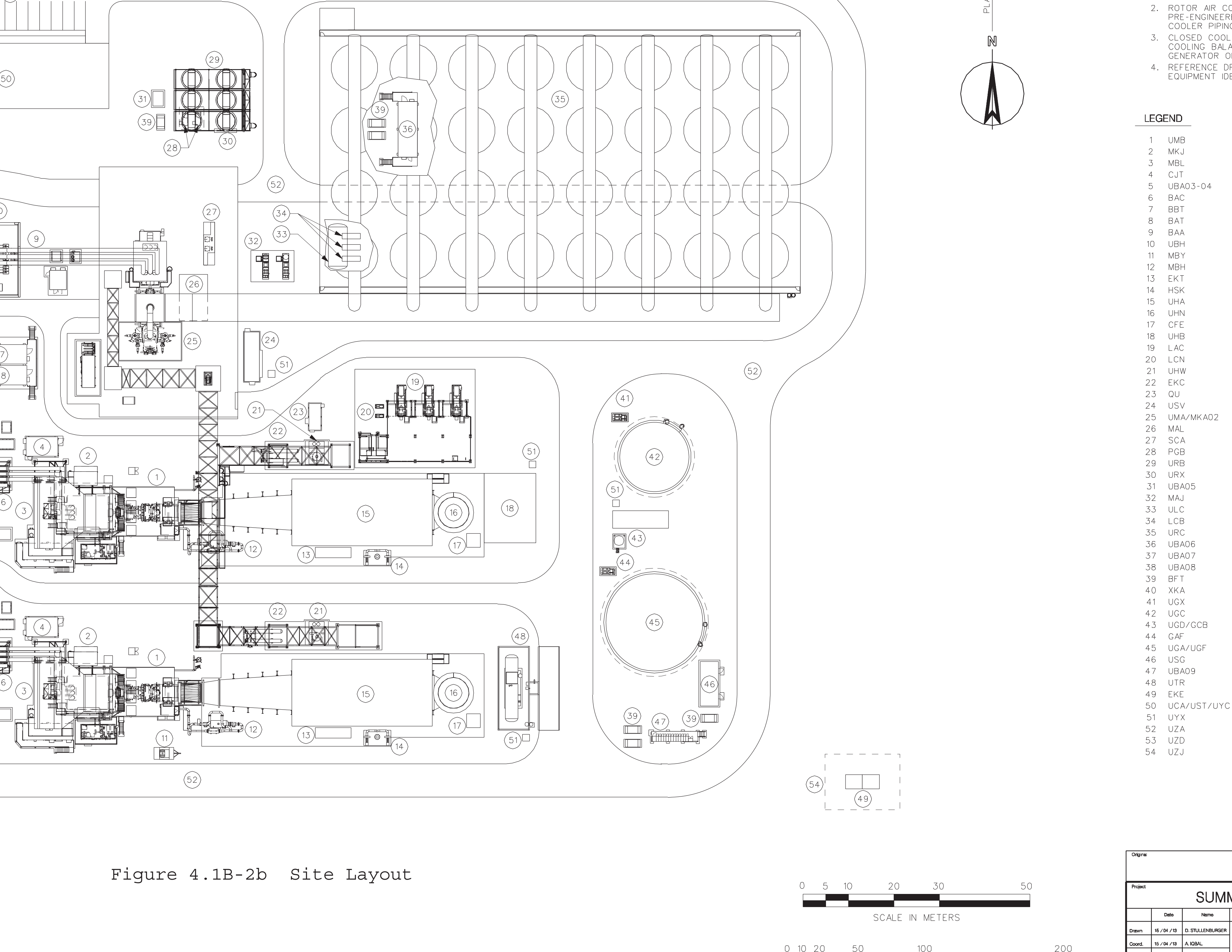
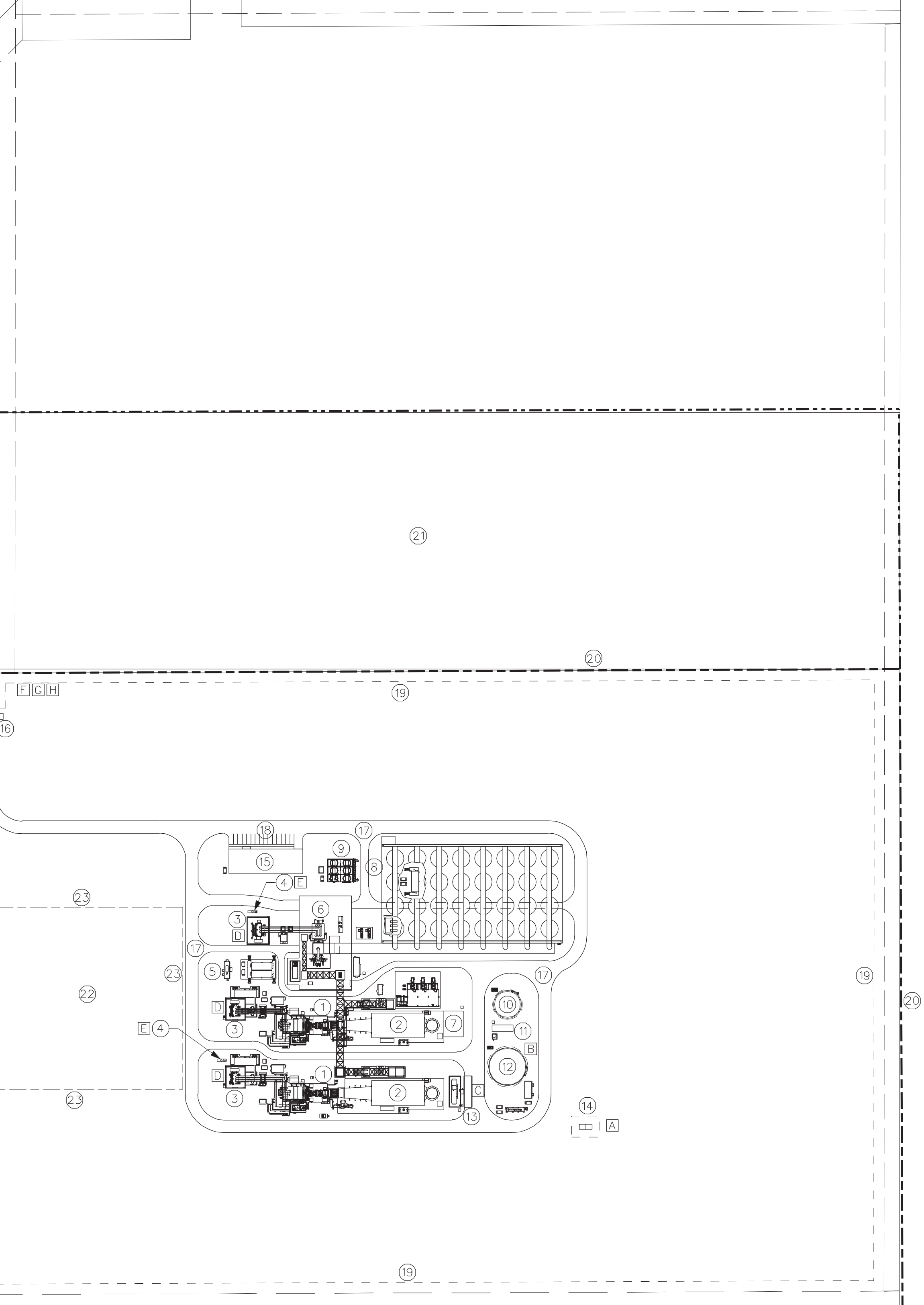


Figure 4.1B-2b Site Layout



NOTES

1. THE EQUIPMENT SH
THIS DESIGN IS SU
OF SIEMENS ENERG
2. REFERENCE DRAWIN
EQUIPMENT IDENTIF
3. REFERENCE DRAWIN
EQUIPMENT IDENTIF

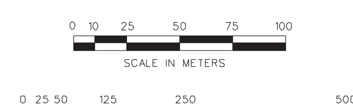
LEGEND

1	UMB	GA
2	UHA	HE
3	BAT	GE
4	UBH	OI
5	XKA	EM
6	MA/MKA	ST
7	UHB	AU
8	URC	AII
9	URB	CL
10	UGC	DE
11	UGD	WA
12	UGA/UGF	RA
13	UYX	AN
14	EKD/EKE	FU
15	UCA/UST/UYC	AD
16	UYE	GU
17	UZA	RO
18	UZD	PA
19	UZJ	FE
20		PR
21		20
22		SW
23		SW
24		EX

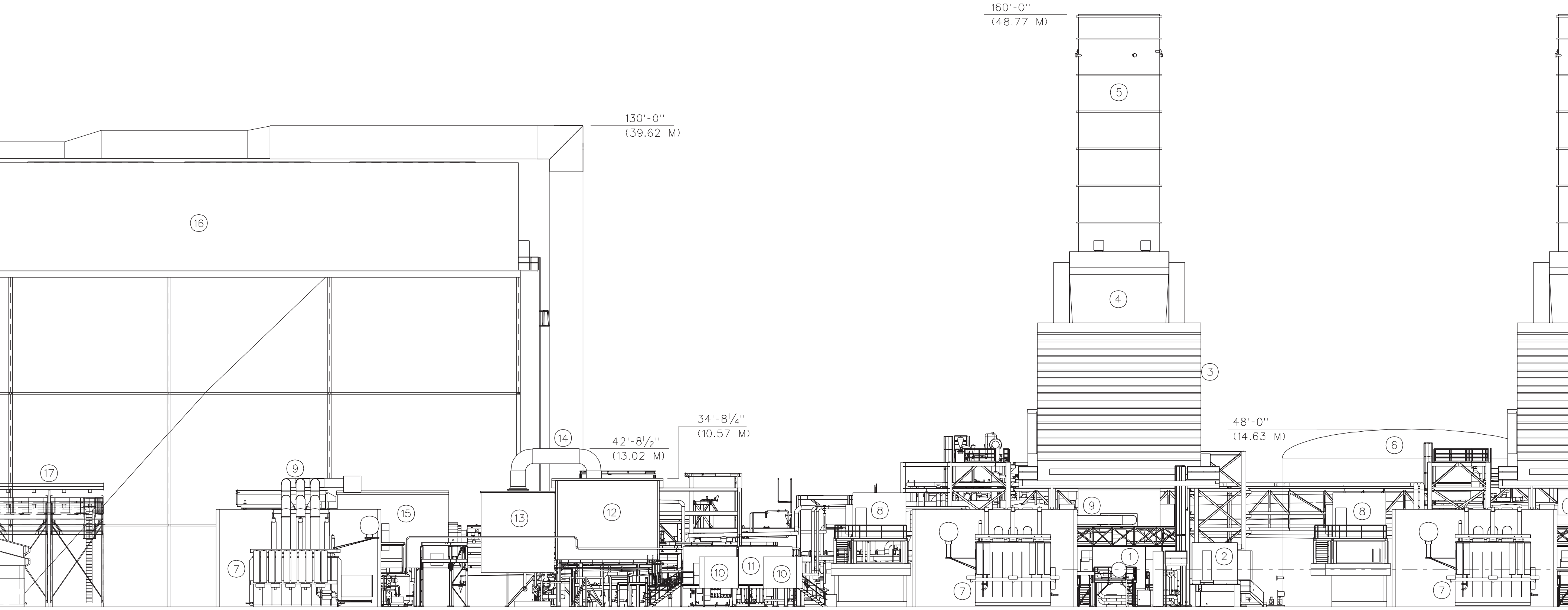
TERMINAL POINTS

A FUEL GAS SUPPLY
B RAW WATER SUPP
C AMMONIA SUPPLY
D HV POWER
E OILY WATER (MANU
F POTABLE WATER
G SANITARY SEWER
H TEMPORARY CONS

Figure 4.1B-2c Site Layout



Original		
Project		SU
	Date	Name
Drawn	15 / 04 / 13	D. STULLENBURGER
Coord.	15 / 04 / 13	A. IQBAL



R	10	BFT	LV TRANSFORMER
	11	UBA06	BALANCE OF PLANT PCC
ER	12	UMA	HP/IP STEAM TURBINE ENCLOSURE
GENERATOR	13	MAC	LP STEAM TURBINE
	14		STEAM TURBINE CROSSOVER PIPE
AGE TANK	15	MKA03	STEAM TURBINE GENERATOR
RANSFORMER	16	URC	AIR COOLED CONDENSER
HGEAR	17	URB	CLOSED COOLING WATER FIN FAN COOLER
	18	UCA/UST/UYC	ADMIN./CONTROL RM./WAREHOUSE BUILDING

NOTES

1. THE EQUIPMENT SHOWN IS REPRESENTATIVE INFORMATION. THIS DESIGN IS SUBJECT TO CHANGE AT THE DISCRETION OF SIEMENS ENERGY, INC.
2. ALL DIMENSIONS SHOWN ARE IN FEET AND INCHES (METERS).

Figure 4.1B-3a Elevation View #1

Original		
Project	SUMM	
	Date	Name
Drawn	15 / 04 / 28	D. STULLENBURGER
Coord.	15 / 04 / 28	A. IQBAL

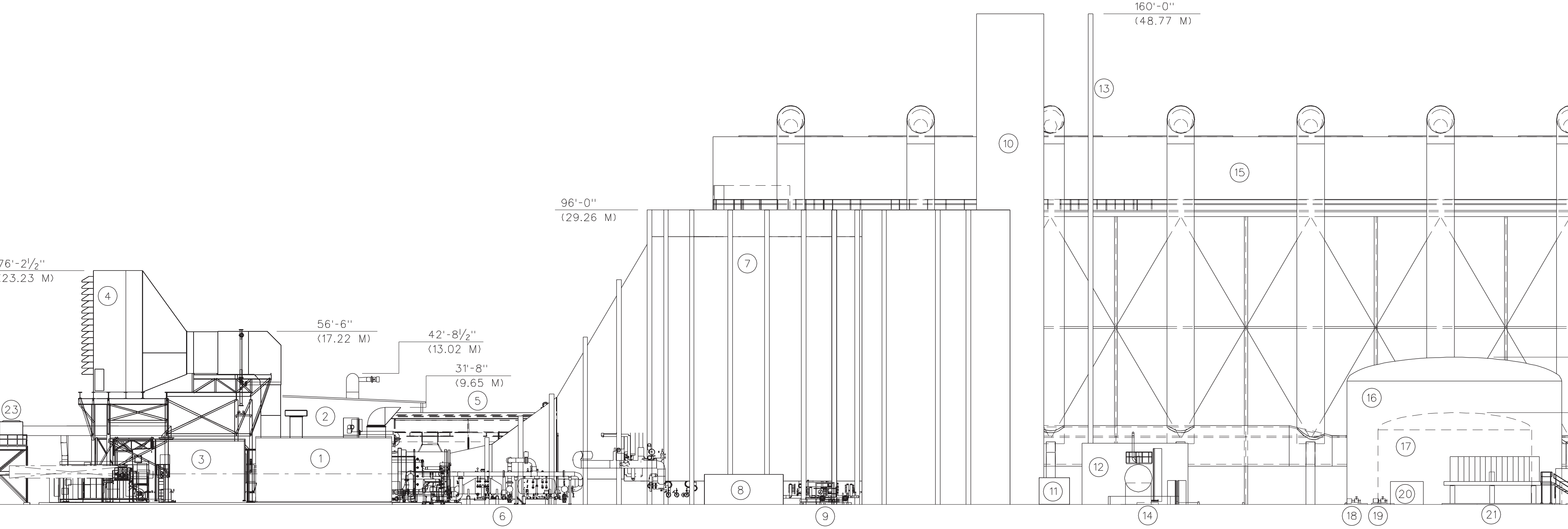


Figure 4.1B-3b Elevation View #2

GAS TURBINE ENCLOSURE
STEAM TURBINE ENCLOSURE
GAS TURBINE GENERATOR
TURBINE AIR INLET FILTER
CLOSED COOLING WATER FIN FAN COOLER
ROTOR AIR COOLER
HEAT RECOVERY STEAM GENERATOR
DUCT FIRING SKID
SCR SKID
HRSG EXHAUST STACK
CONTINUOUS EMISSIONS MONITORING
AUXILIARY BOILER
AUXILIARY BOILER STACK

14	UTR	AMMONIA STORAGE/UNLOADING
15	URC	AIR COOLED CONDENSER
16	UGA/UGF	RAW/FIRE WATER STORAGE TANK
17	UGD	DEMIN. WATER STORAGE TANK
18	GAF	RAW WATER FORWARDING PUMPS
19	UGX	DEMIN. WATER FORWARDING PUMPS
20	BFT	LV TRANSFORMER
21	UBA09	WATER TREATMENT AREA PCC
22	USG	FIRE WATER PUMPS
23	BAC	GENERATOR CIRCUIT BREAKER
24	BBT	AUXILIARY TRANSFORMER
25	BAT	GENERATOR STEP UP TRANSFORMER
26	BAA	ISOPHASE BUS DUCT

NOTES

1. THE EQUIPMENT SHOWN IS REPRESENTATIVE INFORMATION. THIS DESIGN IS SUBJECT TO CHANGE AT THE DISCRETION OF SIEMENS ENERGY, INC.
2. ALL DIMENSIONS SHOWN ARE IN FEET AND INCHES (METERS).

Original

Project

SUMM

	Date	Name
Drawn	15 / 04 / 16	D. STULLENBURGER
Coord.	15 / 04 / 16	A. IQBAL

Figure 4.1B-4a

Winter Composite Wind Rose

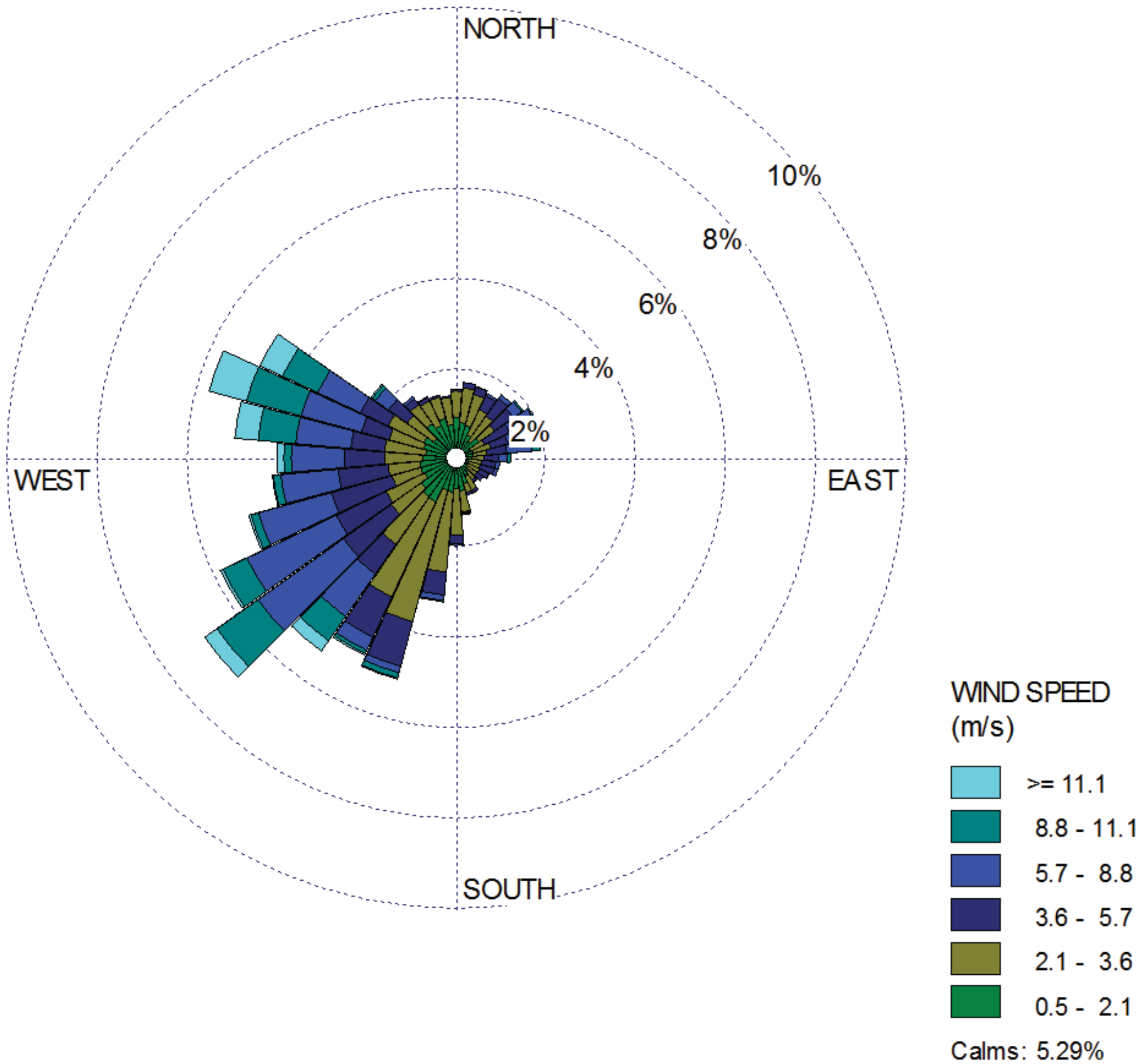


Figure 4.1B-4b

Spring Composite Wind Rose

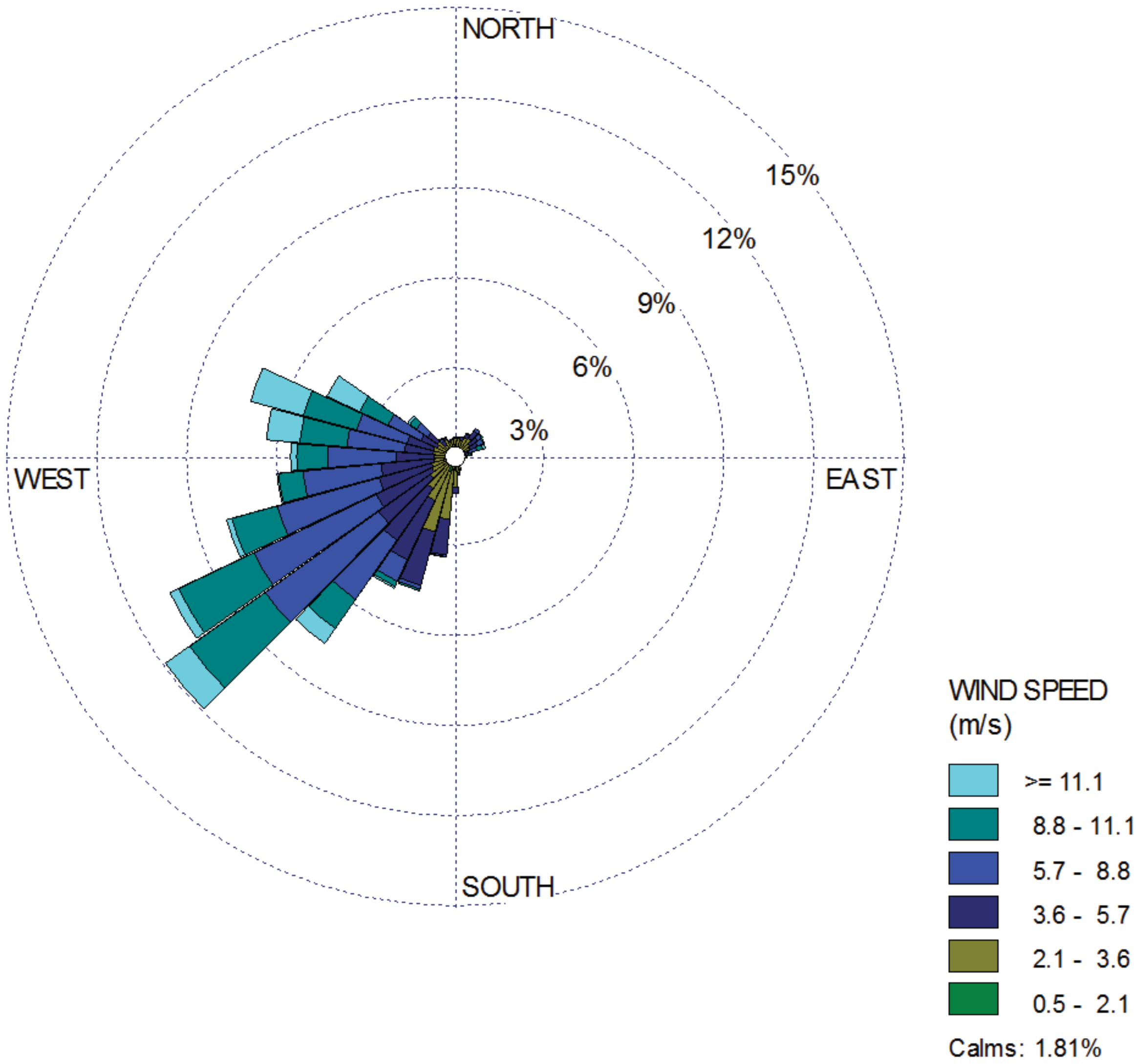


Figure 4.1B-4c

Summer Composite Wind Rose

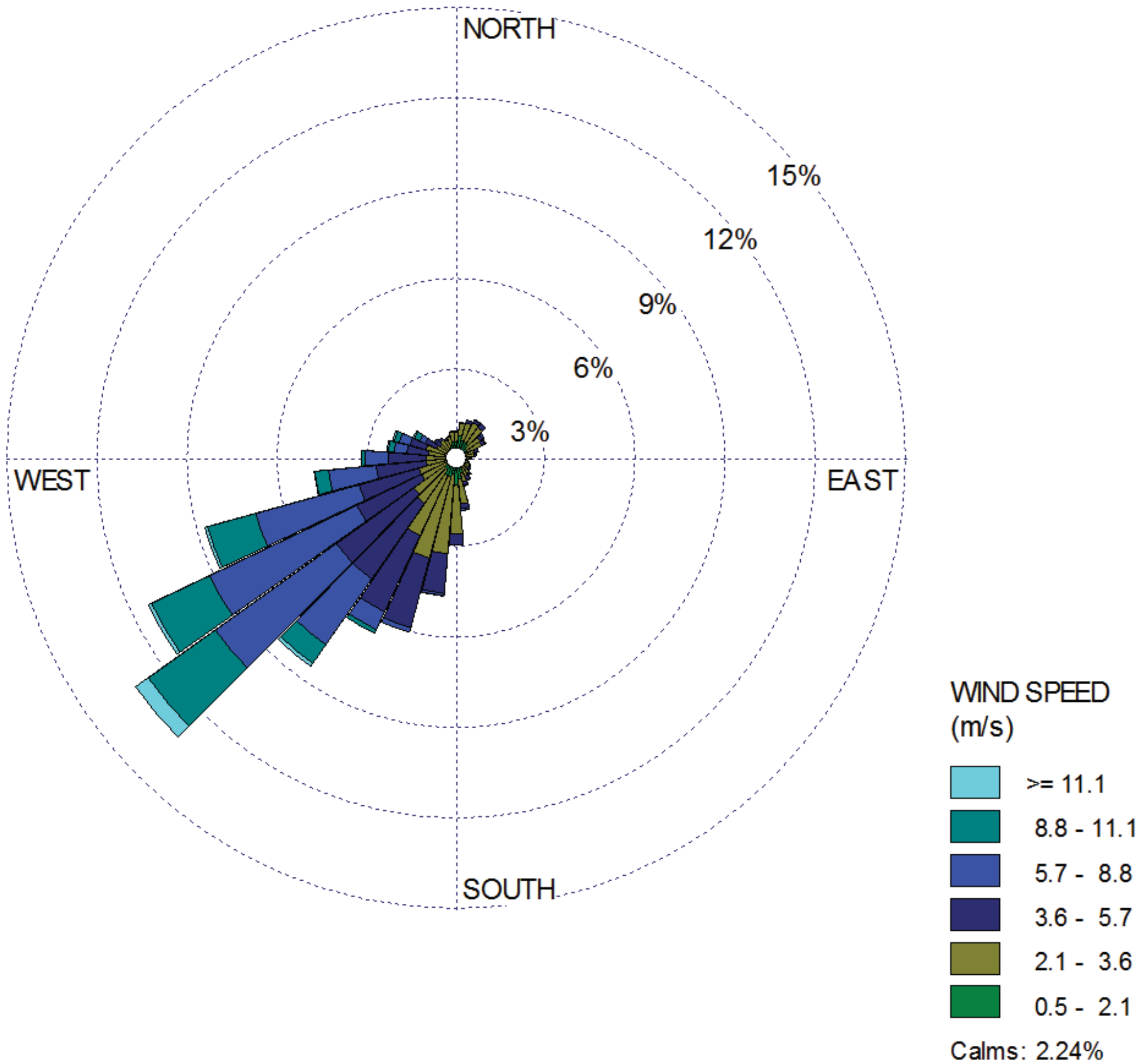


Figure 4.1B-4d

Fall Composite Wind Rose

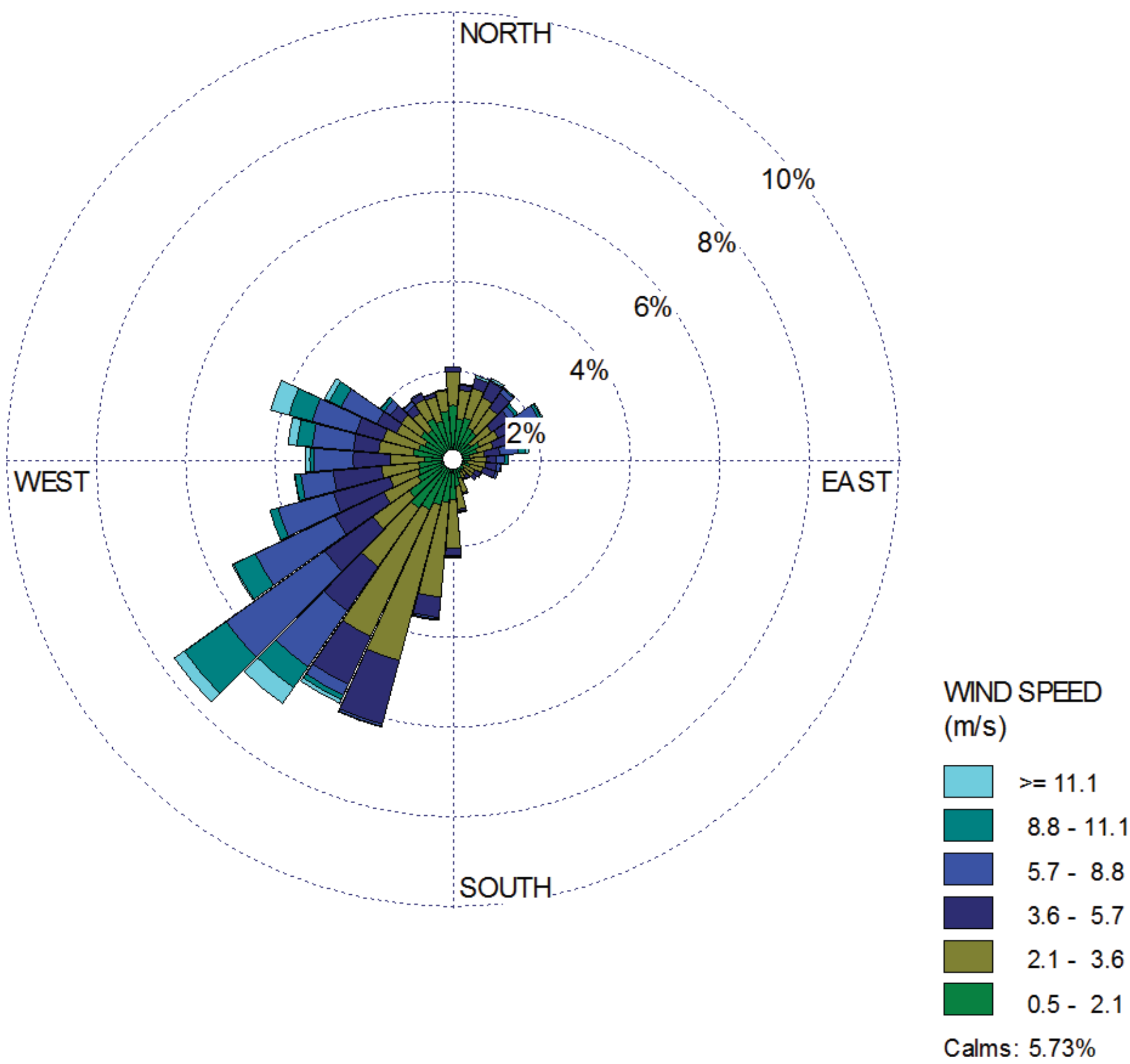


Figure 4.1B-4e

Annual Composite Wind Rose

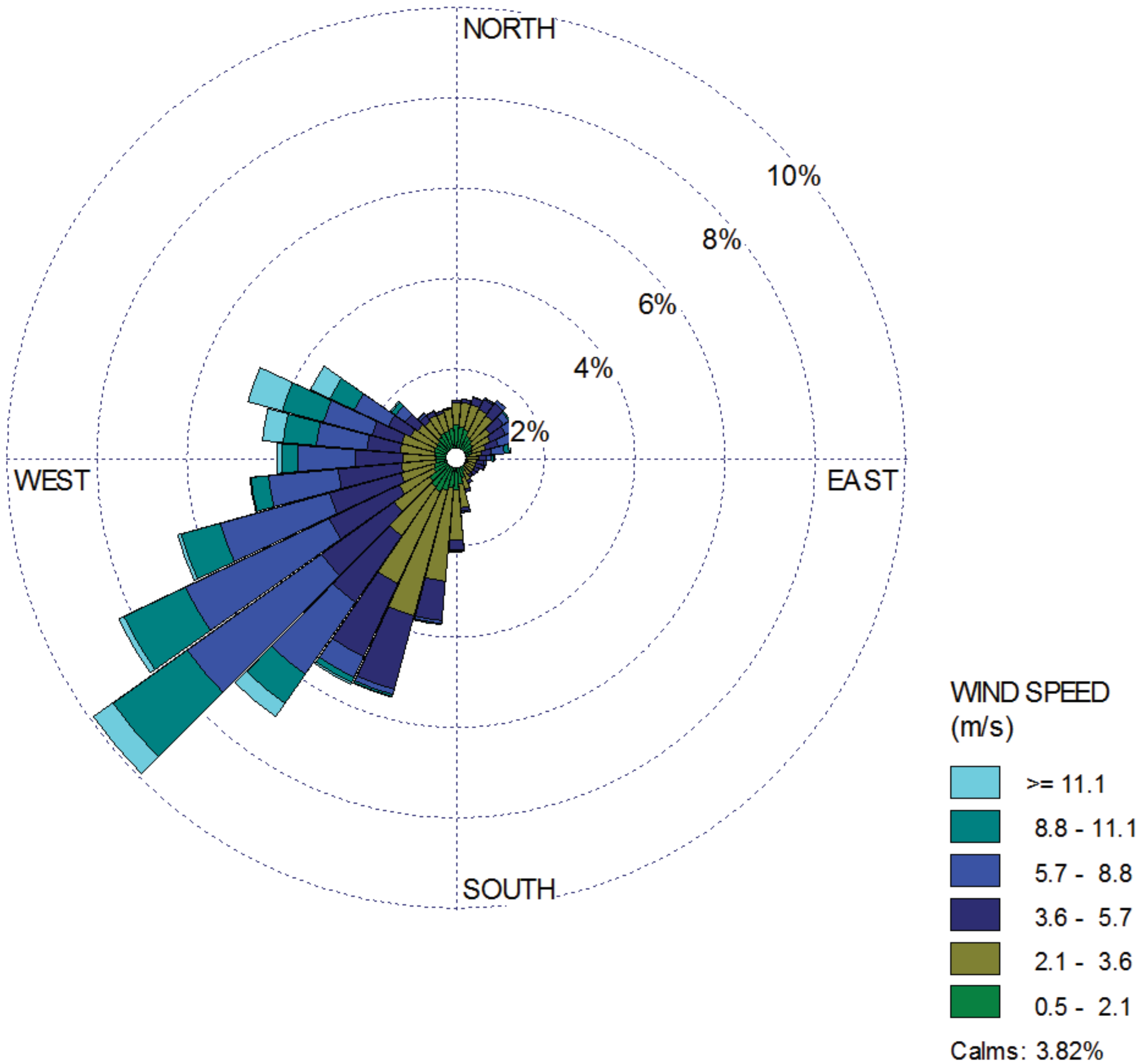


Figure 4.1B-5

AVAQMD (MDAB) Air Monitoring Sites

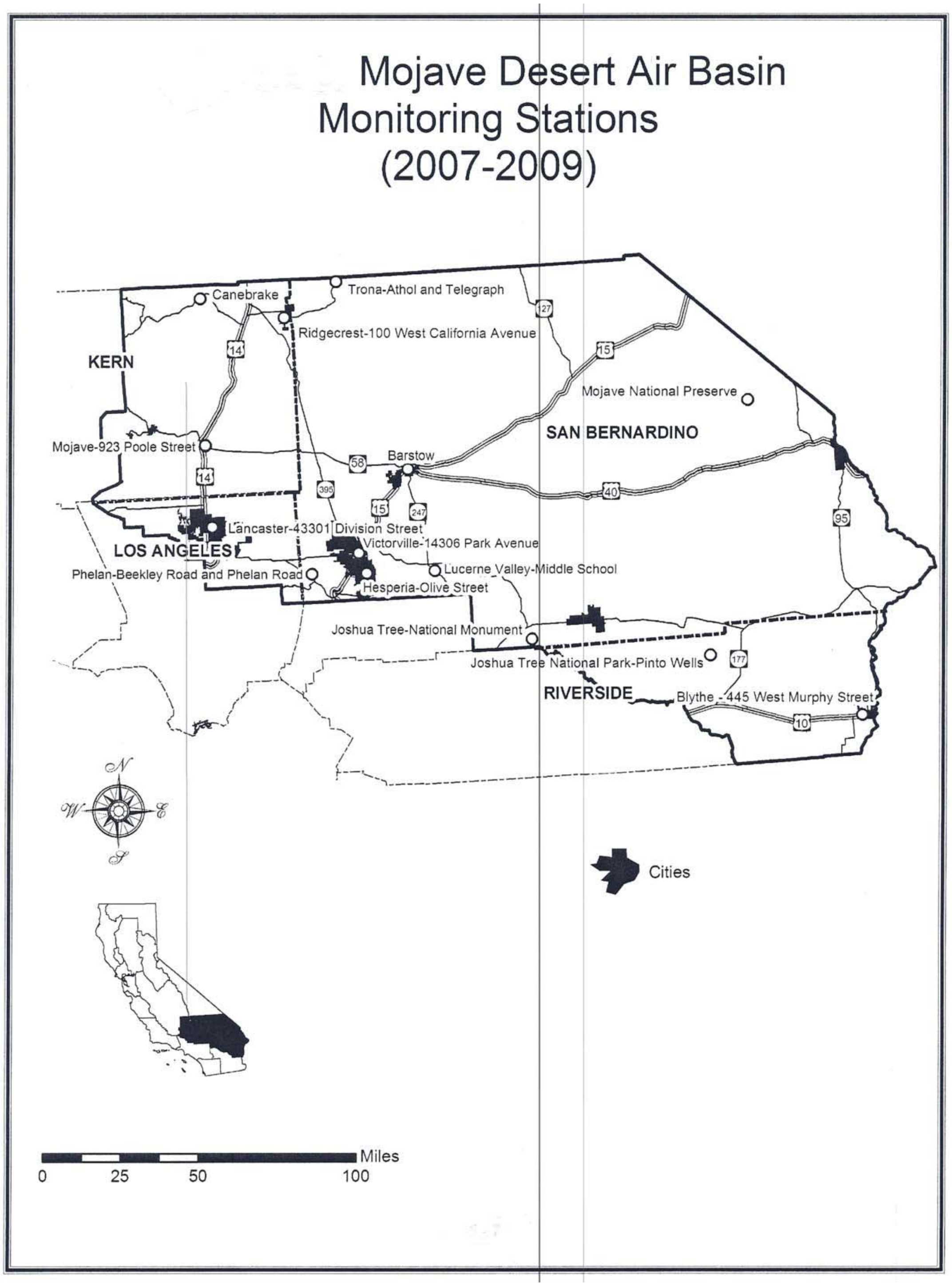


Table 4.1B-6

Palmdale AERMOD Turbine Screening Results

Regular Receptor Grids

160' Stack Height

Emissions Case	Case 1	Case 2	Case 3	Case 4	Case 25	Case 10	Case 11	Case 12	Case 13	Case 14	Case 27
Modeling Case	**11**	**12**	**13**	**14**	**15**	**21**	**22**	**23**	**24**	**25**	**26**
Evaporative Cooler	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**ON**	**ON**	**OFF**	**OFF**	**OFF**
Duct Firing	**OFF**	**ON**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**ON**	**OFF**	**OFF**	**OFF**
Load %	**100%**	**100%**	**75%**	**50%**	**40%**	**100%**	**100%**	**100%**	**75%**	**50%**	**43%**
Ambient Temp, °F	23	23	23	23	23	64	64	64	64	64	64
Stack Exit Temp (deg.F)	195	186	190	184	182	194	195	187	181	178	177
Volumetric Flowrate ACFM	1,337,241	1,322,717	1,075,349	875,178	797,863	1,327,666	1,334,691	1,323,975	1,022,155	836,978	784,096
Stack Inside Diameter (ft)	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00
Stack Height (m)	48.768	48.768	48.768	48.768	48.768	48.768	48.768	48.768	48.768	48.768	48.768
Stack Exit Temp (deg.K)	363.7	358.7	360.9	357.6	356.5	363.2	363.7	359.3	355.9	354.3	353.7
Stack Exit Velocity (m/s)	17.87	17.68	14.37	11.70	10.66	17.74	17.84	17.69	13.66	11.19	10.48
Stack Inside Diameter (m)	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056
Normal Operations - Short-term Screening Emissions (lb/hr/turbine) and Unitized Screening Impacts (for 1.0 g/s/turbine)											
NOx (lb/hr/turbine)	17.1	18.5	13.6	10.5	9.2	16.4	16.7	18.1	13.0	10.0	9.2
CO (lb/hr/turbine)	10.4	11.3	8.3	6.4	5.6	10.0	10.2	11.0	7.9	6.1	5.6
SO2 (lb/hr/turbine)	1.4	1.5	1.1	0.9	0.8	1.4	1.4	1.5	1.1	0.9	0.8
PM10 (lb/hr/turbine)	9.8	11.8	8.0	8.0	8.0	9.7	9.7	11.7	8.0	8.0	8.0
1-Hr Unitized Conc (ug/m3)	7.34915	7.62897	8.26260	9.78110	10.41849	7.39375	7.35479	7.59418	8.93690	10.30569	10.72298
X(m)	392500.0	388000.0	398020.0	398020.0	398020.0	392500.0	392500.0	388000.0	398020.0	398020.0	398020.0
Y(m)	3825500.0	3831000.0	3834380.0	3834380.0	3834380.0	3825500.0	3825500.0	3831000.0	3834380.0	3834380.0	3834380.0
Z(m)	914.3	910.1	764.8	764.8	764.8	914.3	914.3	910.1	764.8	764.8	764.8
YYMMDDHH	14102504	12060105	10082424	10082424	10082424	14102504	14102504	12060105	10082424	10082424	10082424
3-Hr Unitized Conc (ug/m3)	5.93334	6.06396	7.14942	8.24275	8.75465	5.98564	5.93870	6.05471	7.42850	8.57670	8.92811
X(m)	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1
Y(m)	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5
Z(m)	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3
YYMMDDHH	11083015	11083015	11083015	10080118	10080118	11083015	11083015	11083015	11083015	10080118	10080118
8-Hr Unitized Conc (ug/m3)	5.30183	5.41476	6.34053	7.39423	7.89625	5.33892	5.30345	5.39359	6.63047	7.70439	8.04539
X(m)	398722.1	398722.1	398722.1	398702.1	398702.1	398722.1	398722.1	398722.1	398722.1	398702.1	398702.1
Y(m)	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5
Z(m)	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3
YYMMDDHH	12052516	12052516	12052516	10071216	10071216	12052516	12052516	12052516	12052516	10071216	10071216
24-Hr Unitized Conc (ug/m3)	4.08550	4.19621	5.15790	6.35490	6.84349	4.12166	4.09336	4.18367	5.55867	6.65417	6.99455
X(m)	398880.0	398880.0	398722.1	398722.1	398722.1	398880.0	398880.0	398880.0	398722.1	398722.1	398722.1
Y(m)	3833880.0	3833880.0	3833866.5	3833866.5	3833866.5	3833880.0	3833880.0	3833880.0	3833866.5	3833866.5	3833866.5
Z(m)	762.9	762.9	761.3	761.3	761.3	762.9	762.9	762.9	761.3	761.3	761.3
YYMMDDHH	12102124	12102124	12050224	12050224	12050224	12102124	12102124	12102124	12050224	12050224	12050224
Normal Operations - Short-term Pollutant Emissions (g/s/turbine) and Pollutant Screening Impacts											
NOx (g/s/turbine)	2.155	2.331	1.714	1.323	1.159	2.066	2.104	2.281	1.638	1.260	1.159
CO (g/s/turbine)	1.310	1.424	1.046	0.806	0.706	1.260	1.285	1.386	0.995	0.769	0.706
SO2 (g/s/turbine)	0.176	0.189	0.139	0.113	0.101	0.176	0.176	0.189	0.139	0.113	0.101
PM10 (g/s/turbine)	1.235	1.487	1.008	1.008	1.008	1.222	1.222	1.474	1.008	1.008	1.008
1-Hour NOx (ug/m3)	15.837	**17.783**	14.162	12.940	12.075	15.275	15.474	17.322	14.639	12.985	12.428
1-Hour CO (ug/m3)	9.627	**10.864**	8.643	7.884	7.355	9.316	9.451	10.526	8.892	7.925	7.570
8-Hour CO (ug/m3)	6.945	**7.711**	6.632	5.960	5.575	6.727	6.815	7.476	6.597	5.925	5.680
1-Hour SO2 (ug/m3)	1.293	**1.442**	1.149	1.105	1.052	1.301	1.294	1.435	1.242	1.165	1.083
3-Hour SO2 (ug/m3)	1.044	**1.146**	0.994	0.931	0.884	1.053	1.045	1.144	1.033	0.969	0.902
24-Hour SO2 (ug/m3)	0.719	**0.793**	0.717	0.718	0.691	0.725	0.720	0.791	0.773	0.752	0.706
24-Hour PM10 (ug/m3)	5.046	6.240	5.199	6.406	6.898	5.037	5.002	6.167	5.603	6.707	**7.051**

Worst-Case Operating Scenarios are **bolded**.

Palmdale AERMOD Turbine Screening Results
Regular Receptor Grids
160' Stack Height

60' SH

Emissions Case	Case 15	Case 16	Case 17	Case 18	Case 19	Case 20	Case 21	Case 22	Case 23	Case 24	Aux.Boiler
Modeling Case	31	32	33	34	35	41	42	43	44	45	NA
Evaporative Cooler	OFF	ON	ON	OFF	OFF	OFF	ON	ON	OFF	OFF	NA
Duct Firing	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	NA
Load %	100%	100%	100%	75%	50%	100%	100%	100%	75%	53%	NA
Ambient Temp, °F	98	98	98	98	98	108	108	108	108	108	NA
Stack Exit Temp (deg.F)	201	208	200	192	184	205	213	206	196	190	300
Volumetric Flowrate ACFM	1,222,268	1,346,870	1,335,763	967,113	792,896	1,182,441	1,344,061	1,333,863	951,970	803,665	28,413
Stack Inside Diameter (ft)	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	3.00
Stack Height (m)	48.768	48.768	48.768	48.768	48.768	48.768	48.768	48.768	48.768	48.768	18.288
Stack Exit Temp (deg.K)	367.0	370.9	366.5	362.0	357.6	369.3	373.7	369.8	364.3	360.9	422.0
Stack Exit Velocity (m/s)	16.33	18.00	17.85	12.92	10.60	15.80	17.96	17.83	12.72	10.74	20.42
Stack Inside Diameter (m)	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	0.9144
Normal Operations - Short-ter											
NOx (lb/hr/turbine)	14.6	16.3	17.7	11.9	9.2	14.0	16.1	17.6	11.4	9.2	1.21
CO (lb/hr/turbine)	8.9	9.9	10.8	7.2	5.6	8.5	9.8	10.7	6.9	5.6	4.05
SO2 (lb/hr/turbine)	1.2	1.3	1.5	1.0	0.8	1.2	1.3	1.4	1.0	0.8	0.066
PM10 (lb/hr/turbine)	8.8	9.5	11.5	8.0	8.0	8.5	9.4	11.5	8.0	8.0	0.81
1-Hr Unitized Conc (ug/m3)	7.54027	7.01690	7.23661	8.87323	10.38507	7.57268	6.90535	7.10146	8.81644	10.08316	96.63587
X(m)	388000.0	392500.0	392500.0	398020.0	398020.0	388000.0	392500.0	392500.0	398020.0	398020.0	398552.4
Y(m)	3831000.0	3825500.0	3825500.0	3834380.0	3834380.0	3831000.0	3825500.0	3825500.0	3834380.0	3834380.0	3833866.2
Z(m)	910.1	914.3	914.3	764.8	764.8	910.1	914.3	914.3	764.8	764.8	763.3
YYMMDDHH	12060105	14102504	14102504	10082424	10082424	12060105	14102504	14102504	10082424	10082424	13060103
3-Hr Unitized Conc (ug/m3)	6.37238	5.80534	5.90489	7.61867	8.75119	6.52908	5.78373	5.86125	7.64129	8.58672	65.34734
X(m)	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1
Y(m)	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5
Z(m)	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3
YYMMDDHH	11083015	11083015	11083015	10080118	10080118	11083015	11083015	11083015	10080118	10080118	14012006
8-Hr Unitized Conc (ug/m3)	5.69155	5.18881	5.27143	6.76642	7.89350	5.82701	5.15941	5.23020	6.79465	7.75323	56.26533
X(m)	398722.1	398722.1	398722.1	398722.1	398702.1	398722.1	398722.1	398722.1	398722.1	398702.1	398722.1
Y(m)	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5
Z(m)	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3
YYMMDDHH	12052516	12052516	12052516	12052516	10071216	12052516	12052516	12052516	12052516	10071216	14110808
24-Hr Unitized Conc (ug/m3)	4.37740	3.96185	4.05058	5.73758	6.84287	4.46619	3.93228	4.00657	5.77013	6.70560	34.30093
X(m)	398861.8	398880.0	398880.0	398722.1	398722.1	398861.8	398880.0	398880.0	398722.1	398722.1	398722.1
Y(m)	3833866.8	3833880.0	3833880.0	3833866.5	3833866.5	3833866.8	3833880.0	3833880.0	3833866.5	3833866.5	3833866.5
Z(m)	762.8	762.9	762.9	761.3	761.3	762.8	762.9	762.9	761.3	761.3	761.3
YYMMDDHH	12102124	12102124	12102124	12050224	12050224	12102124	12102124	12102124	12050224	12050224	14010224
Normal Operations - Short-ter											
NOx (g/s/turbine)	1.840	2.054	2.230	1.499	1.159	1.764	2.029	2.218	1.436	1.159	0.152
CO (g/s/turbine)	1.121	1.247	1.361	0.907	0.706	1.071	1.235	1.348	0.869	0.706	0.510
SO2 (g/s/turbine)	0.151	0.164	0.189	0.126	0.101	0.151	0.164	0.176	0.126	0.101	0.009
PM10 (g/s/turbine)	1.109	1.197	1.449	1.008	1.008	1.071	1.184	1.449	1.008	1.008	0.102
1-Hour NOx (ug/m3)	13.874	14.413	16.138	13.301	12.036	13.358	14.011	15.751	12.660	11.686	14.689
1-Hour CO (ug/m3)	8.453	8.750	9.849	8.048	7.332	8.110	8.528	9.573	7.661	7.119	49.284
8-Hour CO (ug/m3)	6.380	6.470	7.174	6.137	5.573	6.241	6.372	7.050	5.905	5.474	28.695
1-Hour SO2 (ug/m3)	1.139	1.151	1.368	1.118	1.049	1.143	1.132	1.250	1.111	1.018	0.870
3-Hour SO2 (ug/m3)	0.962	0.952	1.116	0.960	0.884	0.986	0.949	1.032	0.963	0.867	0.588
24-Hour SO2 (ug/m3)	0.661	0.650	0.766	0.723	0.691	0.674	0.645	0.705	0.727	0.677	0.309
24-Hour PM10 (ug/m3)	4.855	4.742	5.869	5.783	6.898	4.783	4.656	5.806	5.816	6.759	3.499

Worst-Case Operating Scenario

Keyword: **DFAULT**

Table 4.1B-7
Palmdale Emission Rates and Stack Parameters for Refined Modeling

	Stack Height meters	Temp, deg K	Exhaust Velocity, m/s	Stack Diam, m	Emission Rates, g/s NOx	SO2	CO	PM10	Emission Rates, lb/hr NOx	SO2	CO	PM10
Averaging Period: One hour for Normal Operations												
Turbine S/HRSG	48.768	358.7	17.68	6.7056	2.331	0.189	1.424	-	18.5	1.5	11.3	-
Turbine N/HRSG	48.768	358.7	17.68	6.7056	2.331	0.189	1.424	-	18.5	1.5	11.3	-
Auxiliary Boiler	18.288	422.04	20.42	0.9144	0.152	8.316E-3	0.510	-	1.21	0.066	4.05	0.81
Fire Pump	5.944	823.71	28.13	0.1270	0.109	2.389E-4	0.144	-	0.864	1.896E-3	1.142	-
Emergency Generator	6.096	677.04	158.76	0.2032	1.056	1.358E-3	0.187	-	8.379	1.078E-2	1.485	-
Averaging Period: Three hours for Normal Operations												
Turbine S/HRSG	48.768	358.7	17.68	6.7056	-	0.189	-	-	-	1.5	-	-
Turbine N/HRSG	48.768	358.7	17.68	6.7056	-	0.189	-	-	-	1.5	-	-
Auxiliary Boiler	18.288	422.04	20.42	0.9144	-	2.772E-3	-	-	-	2.200E-2	-	-
Fire Pump	5.944	823.71	28.13	0.1270	-	7.964E-5	-	-	-	6.320E-4	-	-
Emergency Generator	6.096	677.04	158.76	0.2032	-	4.527E-4	-	-	-	3.593E-3	-	-
Averaging Period: Eight hours for Normal Operations												
Turbine S/HRSG	48.768	358.7	17.68	6.7056	-	-	1.424	-	-	-	11.3	-
Turbine N/HRSG	48.768	358.7	17.68	6.7056	-	-	1.424	-	-	-	11.3	-
Auxiliary Boiler	18.288	422.04	20.42	0.9144	-	-	0.064	-	-	-	0.506	-
Fire Pump	5.944	823.71	28.13	0.1270	-	-	0.018	-	-	-	0.143	-
Emergency Generator	6.096	677.04	158.76	0.2032	-	-	0.023	-	-	-	0.186	-
Averaging Period: 24 hours for Normal Operations												
Turbine S/HRSG - SO2/Case 2	48.768	358.7	17.68	6.7056	-	0.189	-	1.487	-	1.5	-	11.8
Turbine N/HRSG - SO2/Case 2	48.768	358.7	17.68	6.7056	-	0.189	-	1.487	-	1.5	-	11.8
Turbine S/HRSG - PM/Case 27	48.768	353.7	10.48	6.7056	-	-	-	1.008	-	-	-	8.0
Turbine N/HRSG - PM/Case 27	48.768	353.7	10.48	6.7056	-	-	-	1.008	-	-	-	8.0
Auxiliary Boiler	18.288	422.04	20.42	0.9144	-	6.930E-4	-	8.505E-3	-	5.500E-3	-	6.750E-2
Fire Pump	5.944	823.71	28.13	0.1270	-	9.954E-6	-	3.565E-4	-	7.900E-5	-	2.829E-3
Emergency Generator	6.096	677.04	158.76	0.2032	-	5.659E-5	-	1.047E-3	-	4.491E-4	-	8.313E-3
Averaging Period: Annual Periods (includes all Startups/Shutdowns), based on Case 11 (No DB, EVAP on)												
Turbine S/HRSG	48.768	363.7	17.84	6.7056	1.988	-	-	1.160	15.781	-	-	9.209
Turbine N/HRSG	48.768	363.7	17.84	6.7056	1.988	-	-	1.160	15.781	-	-	9.209
Auxiliary Boiler	18.288	422.04	20.42	0.9144	1.455E-2	-	-	9.740E-3	1.155E-1	-	-	7.730E-2
Fire Pump	5.944	823.71	28.13	0.1270	6.464E-4	-	-	5.079E-5	5.130E-3	-	-	4.031E-4
Emergency Generator	6.096	677.04	158.76	0.2032	6.267E-3	-	-	1.492E-4	4.974E-2	-	-	1.184E-3
Averaging Period: One hour for Cold Start based on Case 27 (CAAQS)												
Turbine S/HRSG	48.768	353.7	10.48	6.7056	7.241	-	52.849	-	57.465	-	419.440	-
Turbine N/HRSG	48.768	353.7	10.48	6.7056	7.241	-	52.849	-	57.465	-	419.44	-
Auxiliary Boiler	18.288	422.04	20.42	0.9144	0.152	-	0.510	-	1.21	-	4.05	-
Averaging Period: One hour for Warm Start based on Case 27 (NAAQS) for NO2, Cold start for CO												
Turbine S/HRSG	48.768	353.7	10.48	6.7056	6.795	-	52.849	-	53.925	-	419.440	-
Turbine N/HRSG	48.768	353.7	10.48	6.7056	6.795	-	52.849	-	53.925	-	419.440	-
Auxiliary Boiler	18.288	422.04	20.42	0.9144	0.152	-	0.510	-	1.21	-	4.05	-
Averaging Period: Eight hours for Cold Start based on Case 2												
Turbine S/HRSG	48.768	358.7	17.68	6.7056	-	-	15.944	-	-	-	126.541	-
Turbine N/HRSG	48.768	358.7	17.68	6.7056	-	-	15.944	-	-	-	126.541	-
Auxiliary Boiler	18.288	422.04	20.42	0.9144	-	-	0.128	-	-	-	1.013	-
Fire Pump	5.944	823.71	28.13	0.1270	-	-	0.018	-	-	-	0.143	-
Emergency Generator	6.096	677.04	158.76	0.2032	-	-	0.023	-	-	-	0.186	-
Averaging Period: One hour for Commissioning (Case 27)												
Turbine N/HRSG	48.768	353.7	10.66	6.7056	16.632	-	567.000	-	132.000	-	4500.000	-
Turbine S/HRSG	48.768	353.7	10.66	6.7056	15.372	-	100.296	-	122.000	-	796.000	-
Auxiliary Boiler	18.288	422.04	20.42	0.9144	0.152	-	0.510	-	1.21	-	4.05	-
Averaging Period: Eight hours for Commissioning (Case 27)												
Turbine N/HRSG	48.768	353.7	17.68	6.7056	-	-	567.000	-	-	-	4500.000	-
Turbine S/HRSG	48.768	353.7	17.68	6.7056	-	-	100.296	-	-	-	796.000	-
Auxiliary Boiler	18.288	422.04	20.42	0.9144	-	-	0.128	-	-	-	1.013	-

Assumptions:

Turbine operates 24 hours per day for all cases and pollutants	
Aux.Boiler operates up to 1 hours per day	836 hours per year
Fire Pump operates up to 1 hours per day	52 hours per year
Emer. Gen operates up to 0.5 hours per day	26 hours per year

Startup Emissions Calculations

	1-hr NOx	1-hr CO	8-hr CO	mins/event
Cold Start (lbs/event)	51.480	415.800	415.8	39
Shutdown (lb/event)	-	-	75.9	25
Warm Start (lbs/event)	-	-	378	35
Balance (lb/hr)	17.10	10.40	10.40	
Total (lb/hr)	57.465	419.440	126.541	

Annual NOx & PM: Case I calc sheet (8000 hours made up of 1500 hours DB, 5 cold starts, 35 warm starts 40 shutdowns)
CO and NOx 1-hour Startup Impacts: Cold start is 39 minutes, which is the worst case start, plus 21 minutes of worst-case base load emissions, but no DB.
CO 8-hour Startup Impacts: Calculated as one cold start (39 mins) + one shutdown (25 mins) + one warm start (35 mins) + one shutdown (25 minutes)
+ one hour of max CO with DB plus remaining hours with DB.
Fire pump and gen set not tested during 1 hour start cycle
Aux boiler assumed to operate 2 hours for 8-hour CO startup modeling

APPENDIX 4.1C
MODELING PROTOCOL

APPENDIX 4.1C

Modeling Protocol

The application process required the preparation of a modeling protocol, which outlined the types of impact analyses conducted, the methods used, and the support data used for both the NSR and CEQA based modeling analyses.

Attachment 4.1C-1 Dispersion Modeling and Impact Analysis Protocol

Attachment 4.1C-1

Dispersion Modeling and Impact Analysis Protocol

AVAQMD Regulation XIII New Source Review

Air Quality Modeling Protocol

Palmdale Energy Project

Palmdale, California

Submitted to

Antelope Valley Air Quality Management District

Submitted by

Prepared by

Atmospheric Dynamics, Inc.

April 2015

INTRODUCTION AND PROJECT DESCRIPTION

Palmdale Energy, LLC proposes to construct, own, and operate the Palmdale Energy Project (PEP or Project). The PEP will consist of a natural gas-fired combined-cycle design to be developed on an approximately 50 acre site in the northern portions of the City of Palmdale (City). The combined-cycle equipment will utilize two (2) Siemens SCC6-5000F natural gas-fired combustion turbine generators (CTG), two heat recovery steam generators (HRSG) with supplemental duct firing, one (1) steam turbine generator (STG), one (1) auxiliary boiler, and support equipment.

The Project is designed to provide flexible capacity within the CAISO and will have a nominal electrical output of 660 megawatts (MW). Commercial operation is planned for the summer of 2019. The design and location of the proposed PEP would serve to complement electrical generation needs for flexible resource support.

The project will utilize state of the art Siemens SCC6-5000F gas turbines which will be operated in a combined cycle mode. These turbines are part of Siemens fast start design (Flex 30) which allow for quick start and ramp rates which allow for a high plant efficiency design. The proposed project will contain the following equipment:

- Two (2) Siemens SCC6-5000F natural gas fueled combustion turbines
- Two (2) Heat Recovery Steam Generators (HRSGs) with supplemental duct firing
- One (1) emergency diesel fire pump
- One (1) emergency diesel generator
- Auxiliary boiler used as part of the Flex 30 design
- One air cooled condenser (ACC)
- Air pollution control systems utilizing selective catalytic reduction (SCR) and a CO catalyst in order to minimize emissions

The proposed project will incorporate Best Available Control Technology (BACT) in order to limit emissions of criteria pollutants to the following levels:

- NO_x 2.0 ppm through the use of SCR
- CO 2.0 ppm through the use of a CO catalyst
- VOC 1 ppm through the use of a CO catalyst
- PM10/2.5 exclusive use of pipeline quality natural gas
- SO_x exclusive use of pipeline quality natural gas

The Project will be fueled with natural gas delivered via a new natural gas pipeline. The Southern California Gas Company (SCG) will design and construct the approximately 8.7-mile pipeline.

The PEP site location is located on an approximately 50-acre parcel west of the northwest corner of U.S. Air Force Plant 42, and east of the intersection of Sierra Highway and East Avenue M. The existing site is currently on undeveloped land. The UTM NAD83 Zone 11 coordinates are 398,596.6 meters east and 3,833,693.16 meters north. The site elevation is approximately

2,512 feet above mean sea level (amsl). Figures 1 and 2 present the location of the proposed project.

The applicant will submit air quality impact analyses to both the Antelope Valley Air Quality Management District (AVAQMD) and the California Energy Commission (CEC). The modeling analysis will include impact evaluations for criteria and hazardous air pollutants and will include the CEC requirements for evaluation of project air quality impacts. The purpose of this document is to establish the procedure for meeting the AVAQMD and CEC air quality modeling requirements for the proposed project.

The project is expected to result in emissions that will exceed the AVAQMD Rule 1303 Major Facility significance thresholds for oxides of nitrogen (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs), and fine particulate matter (PM10/2.5). Emissions of sulfur dioxide (SO_2) are expected to be less than the major source thresholds.

The project will trigger AVAQMD and CEC modeling requirements. The air quality analysis will be conducted to demonstrate that impacts from NO_x, CO, SO_x, PM10 and PM2.5 will comply with the California and National Ambient Air Quality Standards (CAAQS/NAAQS) for the applicable averaging periods.

The project is expected to trigger the Prevention of Significant Deterioration (PSD) permitting requirements, which would be required for combined cycle design with a facility wide emissions equaling or exceeding 100 tons per year (tpy) for any criteria pollutant. A separate PSD modeling protocol and permit submittal will be prepared for EPA Region 9.

Table 1 summarizes the proposed analyses on a pollutant specific basis. The modeling will follow procedures as summarized by the United States Environmental Protection Agency (EPA) Appendix W modeling guidelines. Additional guidance procedures are summarized below: U.S. Environmental Protection Agency (USEPA) in its "*Guideline on Air Quality Models*" (including supplements), USEPA Memorandum *"Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard*" (March 2011), USEPA Memorandum *"Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO_2 NAAQS"* (September 2014) " USEPA Memorandum *"Applicability of Appendix W Modeling Guidance for the 1-hour SO_2 National Ambient Air Quality Standard"* (August 2010), USEPA Memorandum *"Modeling Procedures for Demonstrating Compliance with PM2.5 NAAQS (March 2010) and the* California Air Pollution Control Officers Association (CAPCOA) "*Modeling Compliance of the Federal 1-Hour NO_2 NAAQS*"(October 2011).

Table 1 Air Quality Criteria	NO_2	PM10/PM 2.5	VOC	CO	SO_2
AVAQMD Rule 1303 Major Facility Review	✓	✓	✓	✓	
California Ambient Air Quality Standards	✓	✓		✓	✓
National Ambient Air Quality Standards	✓	✓		✓	✓
Impacts to Soils and Vegetation	✓	✓	✓	✓	✓
Cumulative Impact Assessment	✓	✓		✓	✓

Table 2 lists the potential to emit from the proposed project. Based upon the emissions listed in Table 2, Rule 1303 would be triggered for NO_x, CO, PM10/2.5 and VOC.

Table 2 Potential to Emit for the PEP		
Pollutant	**Proposed Facility TPY**	**AVAQMD Rule 1303 Major Facility Thresholds TPY**
NO_x	115	**25**
CO	255	100
VOC	40	**25**
SO_x	9	**25**
PM10/2.5	124	15

PROPOSED AIR QUALITY DISPERSION MODELS

Air Quality Models/Version: The primary United States Environmental Protection Agency (USEPA) dispersion model proposed for use is the AERMOD modeling system (AERMOD version 14134) with the associated meteorological and receptor processing programs AERSURFACE (version 13016), AERMET (version 14134), AERMINUTE (version 14337), and AERMAP (version 11103). AERMOD will be used to quantify pollutant impacts on the surrounding environment based on the emission sources operating parameters and their locations, and will be used for modeling most facility operational impacts in both simple and complex terrain. In addition, the Building Profile Input Program for PRIME (BPIP-PRIME version 04274) will be used for determining building dimensions for downwash calculations in AERMOD and the USEPA-model SCREEN3 (version 13043) is proposed for use to determine inversion-breakup fumigation impacts. The California Health Risk Assessment models/protocols, which include the HARP On-Ramp program, will be used for determining toxic impacts. These models, along with options for their use and how they are used, are discussed below. These models will be used for the following:

- Comparison of operational impacts to significant impact levels (SILs)[1] and California and National Ambient Air Quality Standards (AAQS, also referred to separately as CAAQS and NAAQS) ;
- Cumulative impacts analyses in accordance with Antelope Valley Air Quality Management District (AVAQMD) and California Energy Commission (CEC) requirements;

[1] Regulatory agencies have traditionally defined "significant impact levels" ("SILs") as de minimis threshold values. Source impacts less than SILs typically do not warrant additional analysis or mitigation. If a source's modeled impacts exceed the relevant SIL, the source owner may need to perform a cumulative air quality modeling analysis that includes other appropriate nearby emissions sources to determine whether or not there is a potential for exceedances of the relevant AAQS and, if so, whether the source's emissions will cause or contribute to the predicted AAQS exceedances. Regardless of source impacts, a cumulative air quality modeling analysis is typically performed as part of the CEC Application for Certification submittal.

- Toxics analyses using ARB algorithms as incorporated into California Air Pollution Control Officers Association (CAPCOA) and AVAQMD requirements; and
- Assessment of secondary impacts to soil and vegetation in accordance with CEC requirements.

EXISTING METEOROLOGICAL AND AIR QUALITY DATA

Hourly observations of certain meteorological parameters are used to define the area's dispersion characteristics. These data are used in approved air dispersion models for defining a project's impact on air quality. These data must meet certain criteria established by the USEPA and the following discussion details the proposed data and its applicability to this project.

Project Location/Topography: The project location is located in the Antelope Valley, which forms the western tip of the Mohave Desert as shown on Figure 1. The topography of the area is characterized as high desert with very little variation in terrain until the desert abuts the mountain ranges. The project site is located about 10 kilometers (km) northeast of the San Gabriel Mountains, which separate Antelope Valley from the City of Los Angeles, and 50 km southeast of the Tehachapi Mountains, which separate Antelope Valley from the San Joaquin Valley.

Nearby Surface Meteorological Stations: The proposed project site is located in northern Los Angeles County just north of the Palmdale Airport as shown on Figure 2. The location is in the northern portion of the city of Palmdale and near the southern boundary of the city of Lancaster. The project site is located about 2.5 km west-northwest of the ASOS (Automated Surface Observing System) meteorological monitoring site at the Palmdale Airport as shown on Figure 2. ASOS monitoring sites measure surface meteorological data such as wind speed and direction, temperature, pressure, cloud heights, and sky cover. ASOS surface data are generally selected for processing for AERMOD because ASOS hourly data are routinely recorded and archived, generally meet USEPA data completeness criteria, instruments are located in unobstructed areas meeting USEPA siting criteria, and instrument heights and sensor sensitivities meet USEPA instrument specifications. Also, short-term (1-minute) wind direction and speed data are generally available that can be processed by USEPA programs to eliminate excessive calm observations and to give hourly averages consistent with USEPA modeling requirements. These Palmdale ASOS surface data, when processed with AERMET as described below, result in data recovery greater than 90 percent for every quarter in the five-year period in accordance with USEPA requirements *("Meteorological Monitoring Guidance for Regulatory Modeling Applications,"* EPA-454/R-99-005). Generally, surface data parameters of wind speed, wind direction, and temperature must individually exceed 90% both by quarter and year, as well as wind speed, direction, and stability (turbulence) parameters combined, before any substitutions. These criteria are equaled for all quarterly/annual periods of the surface data selected (the only data substitutions used for any the meteorological data processing were for upper air data in the second quarter of 2010 as described below).

Selection of Surface Meteorological Data: As noted above, the project vicinity and immediate areas of Antelope Valley are relatively flat, an important consideration in the selection of surface meteorological data for use in assessing the projects impacts on regional air quality. Under these circumstances (large expanses of relatively flat terrain), the nearest meteorological data meeting USEPA siting and instrument criteria would be expected to be the most representative of the project location. The ASOS data fulfill both criteria, being located in the immediate project vicinity and meeting USEPA siting and instrument criteria. Thus, the Palmdale Airport ASOS data are proposed as the surface meteorological data for modeling facility emissions. The close proximity of the ASOS station to the project site virtually assures that it could be considered representative, if not the equivalent of onsite data.

Both the ASOS and PEP sites are located in the relatively flat Antelope Valley at nearly identical distances and orientations from the relatively distant mountains which define the valley boundaries. There are no intervening terrain features between the ASOS location and project site to adversely affect the relative synoptic-scale wind patterns at either location (compared to each other). The current ASOS location from the NCDC Historical Observing Metadata Repository (HOMR) was verified and then refined to its exact location based on Google Earth photos (location is shown below). The 1-minute and 1-hour ASOS data for Palmdale Airport were downloaded from the appropriate National Climatic Data Center (NCDC) FTP websites.

Selection of Upper Air Meteorological Data: The representative radiosonde observations nearest to the project site are Edwards Air Force Base and the Yuma Proving Ground. Unfortunately, soundings at military installations like Edwards and Yuma, Arizona are not taken every day. The nearest representative civilian airports with 12Z soundings taken every day are Las Vegas, NV, Phoenix, AZ, and Tucson, AZ – all relatively high desert locations in the Southwest United States. Recent radiosonde measurements at Las Vegas did not begin until December 2010, which would preclude the collection of a complete continuous 5-year period of meteorological data using Las Vegas soundings alone. Phoenix soundings are taken only during the summer months, i.e., June 21st through September 18th for 2010, but the data are relatively complete for the three months with soundings and are more representative of the site than Tucson. Tucson soundings are taken for all of 2010, but many of the second and third quarter soundings are missing the first few levels of data, including the surface level. Therefore, the second quarter Tucson data were supplemented with soundings taken at Edwards (April 8, 10, 12, 14, 16, 17, 19, 20; May 15, 17, 18, 19, 25, 27; and June 2, 14) and Yuma (April 5, 28; May 13; and June 1, 3, 7, 8). Phoenix/Tucson (2010) and Las Vegas (2011-2014) radiosonde data are proposed as the upper air meteorological data for modeling facility emissions. These data were downloaded from the National Oceanic and Atmospheric Administration (NOAA) Earth System Research Laboratory (ESRL) website.

Selection of Meteorological Data Period: The Palmdale Airport ASOS instrumentation has been at its present location with the current configuration of sensors since February 8, 2007 according to HOMR (with available 1-minute data since January 2007). Therefore, the most recent five-year period (2010-2014) was selected.

Meteorological Data Processing/Options: These 2010-2014 Palmdale ASOS surface data and concurrent Las Vegas/Phoenix/Tucson radiosonde data will be processed with the latest versions of AERMET (14134) and AERMINUTE (14337). AERMINUTE/AERMOD default and standard options will be used, including MODIFY for upper air data in Stage 1, the default ±1 hour window for 12 Zulu (Z) sounding data (4 AM Pacific Standard Time) in Stage 3, and a 0.5 m/s threshold wind speed for 1-minute ASOS data in Stage 3.

Meteorological Data Surface Characteristics: AERMET also requires input summaries of the surface characteristics for the area surrounding the Palmdale ASOS monitoring site. These surface characteristics will be calculated with the USEPA-program AERSURFACE (version 13016) based on USEPA guidance. AERSURFACE uses 1992 National Land Cover Data (NLCD) from the United States Geological Survey (USGS) to determine land use based on standardized land cover categories. For this analysis, the Southern California NLCD file from the USGS website referenced in the AERSURFACE User's Manual (http://edcftp.cr.usgs.gov/pub/data/landcover/states/) will be used. A review of historical Google Earth images shows only minor changes in land use within 1 km of the current ASOS location from the time of the 1992 NLCD to the present time. Therefore, the primary surface characteristics derived from the 1992 data (roughness length) should be representative of current conditions.

AERSURFACE will be executed in accordance with the USEPA guidance documents "*AERMOD Implementation Guide,*" March 19, 2009, and "*AERSURFACE User's Guide*," EPA-454/B-08-001, revised January 16, 2013. AERSURFACE determines the midday albedo, daytime Bowen ratio, and surface roughness length representative of the surface meteorological station. ***Bowen ratio*** is based on a simple unweighted geometric mean while ***albedo*** is based on a simple unweighted arithmetic mean for the 10x10 km square area centered on the selected location (i.e., no direction or distance dependence for either parameter). ***Surface roughness length*** is based on an inverse distance-weighted geometric mean for upwind distances up to the USEPA-recommended one (1) km radius from the selected location. The circular surface roughness length area (1-km radius) can be divided into any number of sectors as appropriate (USEPA guidance recommends that no sector be less than 30º in width).

Only one 360° sector is proposed for calculating roughness lengths due to the homogeneity of the area within the USEPA-recommended radius of 1 km as shown on Figure 3. Months were assigned to seasons as follows: November through April as fall (autumn with un-harvested cropland) and May through October as summer (midsummer with lush vegetation) as has been done for previous projects in the Mojave Desert Air Basin. Other AERSURFACE options will be selected as Airport=YES, continuous snow cover = NO, and arid = YES.

Temporal variations of monthly precipitation must be considered to calculate the albedo for AERMET processing in accordance with USEPA recommendations. Precipitation data should be measured at the nearest representative location to the surface data with the most complete precipitation record, particularly for the years of meteorology being modeled. Historical precipitation data are measured at the both Palmdale and Lancaster Airports, as well as cooperative stations at both cities. Palmdale Airport is obviously the most representative and has the most complete data for the modeling period (2010-2014) as well as a 30-year period (although not continuous since precipitation data weren't measured/recorded from 1974-1998). The monthly precipitation amounts from the Palmdale Airport for the latest 30 years

(1960-1973 and 1999-2014) were sorted and compared to the monthly precipitation amounts for the five years of meteorological data to be modeled with AERMOD (2010-2014). The modeled months with precipitation amounts in the range of the driest 9 years by month for the 30-year climatology are given the albedo for DRY conditions. The modeled months (2002-2006) with precipitations amounts in the range of the wettest 9 years by month for the 30-year climatology are given the albedo for WET conditions. The remainder of the modeled months is given the albedo for AVG (average) conditions and represents the middle 22 years by month in the 30-year precipitation climatology (except that any month with 0.05” or less are given the albedo for DRY conditions. The 30-year precipitation climatology is shown in Table 3 and the AERSURFACE inputs/outputs are shown in Table 4.

Table 3
Palmdale Airport 30-year Precipitation Climatology Summary

SORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.69
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83
3	0.00	0.01	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.96
4	0.00	0.02	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.08
5	0.03	0.06	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.21
6	0.03	0.07	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.44
7	0.03	0.10	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	2.73
8	0.05	0.18	0.15	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	2.93
9	0.09	0.23	0.15	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.14	3.73
10	0.10	0.32	0.22	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.16	3.74
11	0.14	0.43	0.22	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.17	3.80
12	0.18	0.43	0.25	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.18	3.80
13	0.22	0.50	0.29	0.09	0.00	0.00	0.00	0.00	0.00	0.01	0.27	0.23	3.98
14	0.22	0.54	0.33	0.11	0.00	0.00	0.00	0.00	0.00	0.02	0.34	0.32	4.06
15	0.23	0.69	0.40	0.13	0.00	0.00	0.00	0.00	0.00	0.02	0.34	0.35	4.11
16	0.26	0.81	0.42	0.13	0.00	0.00	0.01	0.00	0.00	0.06	0.43	0.60	4.47
17	0.36	0.82	0.49	0.19	0.01	0.00	0.01	0.00	0.00	0.08	0.45	0.62	5.07
18	0.42	0.97	0.50	0.23	0.02	0.00	0.01	0.00	0.00	0.08	0.51	0.67	5.43
19	0.43	1.23	0.53	0.28	0.03	0.00	0.01	0.01	0.00	0.13	0.73	0.71	5.65
20	0.59	1.39	0.57	0.34	0.03	0.00	0.03	0.04	0.01	0.14	0.73	0.71	5.78
21	0.84	1.44	0.65	0.37	0.07	0.00	0.04	0.04	0.02	0.15	0.87	0.77	5.91
22	0.97	1.93	0.68	0.43	0.13	0.00	0.04	0.04	0.04	0.21	1.00	1.03	6.05
23	1.19	2.17	0.68	0.45	0.15	0.00	0.04	0.05	0.12	0.21	1.00	1.11	6.90
24	1.23	2.33	0.69	0.51	0.16	0.00	0.05	0.09	0.24	0.22	1.15	1.43	7.27
25	1.35	2.72	0.88	0.62	0.18	0.02	0.06	0.12	0.26	0.23	1.18	1.74	7.55
26	1.48	2.87	0.94	0.65	0.18	0.11	0.09	0.12	0.33	0.31	1.60	1.89	8.45
27	1.81	3.33	1.02	0.67	0.24	0.15	0.14	0.14	0.40	1.39	1.86	2.57	9.04
28	2.86	3.60	1.29	0.74	0.25	0.22	0.15	0.32	0.66	1.56	2.40	2.97	9.44
29	3.04	3.75	1.41	1.47	0.32	0.29	0.50	0.36	0.85	2.69	4.01	3.30	10.90
30	3.15	4.57	1.56	1.52	0.96	0.45	0.58	1.76	1.75	2.76	4.89	3.42	12.96
2010	2.86	1.93	0.29	0.65	0.00	0.00	0.04	0.00	0.00	1.56	0.27	3.30	10.90
2011	0.42	0.69	1.41	0.01	0.01	0.00	0.14	0.00	0.85	0.14	0.45	0.35	4.47
2012	0.09	0.43	0.65	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.18	2.08
2013	0.36	0.10	0.25	0.00	0.15	0.00	0.09	0.04	0.00	0.08	1.86	0.00	2.93
2014	0.00	1.39	0.57	0.13	0.96	0.00	0.00	0.04	0.12	0.00	0.00	2.57	5.78

Sorted Data - The 30-years of climatology were SORTED to determine DRY/AVG/WET months. Generally, the driest and wettest 9 years were used to delineate DRY/WET (AVG was anything in-between). The one exception: months with precipitation ≤ 0.05" were considered DRY.

Table 4
Palmdale Airport Monthly Inputs/Outputs to AERSURFACE

Month	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC
Seasonal Assumptions for Surface Roughness (meters) and Albedo												
Season	Fall	Fall	Fall	Fall	Summer	Summer	Summer	Summer	Summer	Summer	Fall	Fall
Arid	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Airport	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Surface Roughness (meters)												
	0.119	0.119	0.119	0.119	0.119	0.119	0.119	0.119	0.119	0.119	0.119	0.119
Noontime Albedo												
	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Bowen Ratio based on the following surface moisture contents												
2010	WET	WET	AVG	WET	DRY	DRY	DRY	DRY	DRY	WET	AVG	WET
2011	AVG	AVG	WET	DRY	DRY	DRY	WET	DRY	WET	AVG	AVG	AVG
2012	DRY	AVG	AVG	WET	DRY	DRY	DRY	DRY	DRY	DRY	DRY	AVG
2013	AVG	DRY	AVG	DRY	WET	DRY	WET	DRY	DRY	AVG	WET	DRY
2014	DRY	AVG	AVG	AVG	WET	DRY	DRY	DRY	WET	DRY	DRY	WET
Bowen Ratio by Year/Month												
2010	0.89	0.89	1.96	0.89	2.98	2.98	2.98	2.98	2.98	0.70	1.96	0.89
2011	1.96	1.96	0.89	4.14	2.98	2.98	0.70	2.98	0.70	1.42	1.96	1.96
2012	4.14	1.96	1.96	0.89	2.98	2.98	2.98	2.98	2.98	2.98	4.14	1.96
2013	1.96	4.14	1.96	4.14	0.70	2.98	0.70	2.98	2.98	1.42	0.89	4.14
2014	4.14	1.96	1.96	1.96	0.70	2.98	2.98	2.98	0.70	2.98	4.14	0.89

Site Urban/Rural Classification: Land use surrounding the facility location has changed little since the 1992 NLCD based on historical Google Earth photos, so AERSURFACE was used to determine urban/rural land uses and percentages for the area within three (3) km of the proposed site location. About 15% of this area around the proposed project site is characterized as urban, consisting of commercial (airport buildings) and transportation (runways) land uses. The other 85% of this area would be characterized as rural, consisting mostly of shrubland (66%), grasslands/pasture/hay (8%), bare rock (7%), and residential (4%) land uses. In accordance with the Auer land use classification methodology (USEPA's "*Guideline on Air Quality Models*"), since the land use within the area circumscribed by a three km radius around the facility is greater than 50 percent rural, the urban dispersion option in AERMOD will not be used in the modeling analyses supporting the permitting of the facility.

Meteorological Data Representativeness: The proposed use of the five (5) years of Palmdale Airport ASOS surface meteorological data would satisfy the definition of on-site data. USEPA defines the term "on-site data" to mean data that would be representative of atmospheric dispersion conditions at the source and at locations where the source may have a significant impact on air quality. Specifically, the meteorological data requirement originates from the Clean Air Act in Section 165(e)(1), which requires an analysis "of the ambient air quality at the facility and in areas which may be affected by emissions from such facility for each pollutant subject to regulation under [the Act] which will be emitted from such facility." This requirement and USEPA's guidance on the use of on-site monitoring data are also outlined in the On-Site Meteorological Program Guidance for Regulatory Modeling Applications (USEPA, 1987). The representativeness of meteorological data is dependent upon: (a) the proximity of the meteorological monitoring site to the area under consideration; (b) the complexity of the topography of the area; (c) the exposure of the meteorological sensors; and (d) the period of time during which the data are collected.

First, the Palmdale Airport meteorological monitoring site is the closest ASOS site and located in very close proximity to the facility location, about 2.5 kilometers to the east-southeast, with nearly identical elevations above mean sea level (amsl). Second, both locations are located in the same area of the broad and relatively flat Antelope Valley. Third, the ASOS monitoring location at the airport was selected to be far enough from wind flow perturbations caused by buildings and other features, which can be seen on the earlier figures. Fourth, the period of meteorological data selected at the time of the modeling analyses (2010-2014) would be expected to be the most representative of current conditions, with the same general land uses surrounding the current ASOS location and airport as well as the proposed project site. In fact, a review of historical and current Google Earth photoaerials, shows that nearby land uses now at both locations are similar to the land uses reflected in the 1992 NLCD. These data meet the USEPA data recovery requirements for air quality modeling as described above.

At noted above, the surface characteristics of land uses, roughness lengths, Bowen ratios, and albedos are very similar for the two locations. AERSURFACE results for both the ASOS location and proposed project site for the areas circumscribed by a 1 km radius around each location are shown on Table 5.

Table 5
Surface Characteristics for ASOS Location
and Proposed Project Site

Standardized Land Use Category (for area within a 1km radius)	ASOS Location	Project Site
Low Intensity Residential:	0.3%	0.7%
Commercial/Industrial/Transportation:	32.1%	10.3%
Bare Rock/Sand/Clay:	1.0%	5.1%
Shrubland:	54.0%	80.6%
Grasslands/Herbaceous:	11.7%	3.3%
Pasture/Hay:	0.8%	-
Row Crops:	0.1%	-

Most of the land use in the general region consists of shrubland or agricultural classifications. The larger percentage of commercial land use for ASOS location is due to the airport runways as shown in earlier figures. Transportation land use has smaller roughness lengths than commercial/industrial land uses and would be similar to the roughness lengths for shrubland and grasslands that predominate the project site. Therefore, land use categories at the two site locations are very similar with transportation/shrublands/grasslands comprising 90% or more of the total land use types within 1 km of both locations.

Representativeness is defined in the document "Workshop on the Representativeness of Meteorological Observations" (Nappo et. al., 1982) as "the extent to which a set of measurements taken in a space-time domain reflects the actual conditions in the same or different space-time domain taken on a scale appropriate for a specific application." Judgments of representativeness should be made only when sites are climatologically similar, as is the case with the meteorological monitoring site and the proposed project location. In determining the representativeness of the meteorological data set for use in the dispersion models at the project site, the consideration of the correlation of terrain features to prevailing meteorological conditions, as discussed earlier, would be nearly identical to both locations since the orientation and aspect of terrain at the proposed project location correlates well with the prevailing wind fields as measured by and contained in the meteorological dataset. In other words, the same mesoscale and localized geographic and topographic features that influence wind flow patterns at the meteorological monitoring site also influence the wind flow patterns at the proposed project site.

For these reasons, the Palmdale Airport meteorological data selected for use in modeling emissions from the proposed project are expected to satisfy the definition of representative meteorological data and are similar to the dispersion conditions at the project site and to the regional area. An annual wind rose for the five-year modeling period is shown in Figure 4.

Existing Baseline Air Quality Data: The nearest air quality monitoring site to the proposed project site is the Lancaster monitoring station, measuring all criteria pollutants other than SO_2. The nearest representative SO_2 monitoring site is located in Victorville. Due to their close proximity in the same air basin, these two locations were selected as being representative of baseline air quality data for the proposed project location. The Lancaster monitoring station's objective is for measuring background air quality to support compliance with the Ambient Air Quality Standards. The spatial scale of the monitoring station is middle scale for gaseous pollutants (ozone, CO, and NO_2) and neighborhood scale for particulate matter (PM10 and PM2.5). Based on these two spatial scales, the overall objective of the monitoring station is population oriented. Ambient monitoring data for these sites for the most recent three-year period (2011-2013) are summarized in Table 6. Data from these sites is estimated to present a reasonable representation of background air quality for the project site and impact area.

Table 6
Measured Baseline Air Quality Data

Pollutant	Site	Averaging Time	2011	2012	2013
Ozone, ppm	Lancaster	1 Hr Max CAAQS	0.115	0.112	0.108
		8 Hr Max* C/NAAQS	0.100	0.095	0.093
PM10, $\mu g/m^3$	Lancaster	24 Hr Max CAAQS	51	47	185
		24-Hr H2H NAAQS	43	38	74
		Annual Mean CAAQS	19.6	19.8	28.3
PM2.5, $\mu g/m^3$	Lancaster	24 Hr 98^{th}% NAAQS	50**	14**	11
		Annual Mean C/NAAQS	7.1**	5.4**	5.8
NO_2, ppb	Lancaster	1 Hr Max CAAQS	58	49	48
		1 Hr 98^{th}% NAAQS	50	46	44
		Annual Mean	12	9	8
CO, ppm	Lancaster	1 Hr Max* C/NAAQS	2.3	1.9	1.9
		8 Hr Max* C/NAAQS	1.3	1.4	1.2
SO_2, ppb	Victorville	1 Hr Max CAAQS	13	6	4
		1 Hr 99^{th}% NAAQS	7	5	4
		24 Hr Max CAAQS	7	3	2

*For 1-hour and 8-hour ozone and CO, the maximum measured background concentration required for the CAAQS assessment will likely be used for the NAAQS assessment. Normally, the NAAQS assessments are based on lesser concentrations such as: the fourth-highest measured concentration over three years for 1-hour ozone, the second-highest measured concentration each year for 24-hour PM10 and 1-hour and 8-hour CO, and the fourth-highest daily maximum 8-hour concentration averaged over three years for the ozone NAAQS.

**Incomplete data for year (does not meet ARB/USEPA criteria).

Source: USEPA AirData website (www.epa.gov/airdata) except for annual PM10 and NO_2, taken from ARB iADAM Top -4 website (http://www.arb.ca.gov/adam/topfour/topfour1.php).

Based on the data presented in Table 6, background values were selected as appropriate for the standard as shown in Table 7. Generally the highest baseline concentration for any of the most recent three years is used for comparison to any of the CAAQS and many of the NAAQS. Some of the NAAQS are based on 3-year averages of the values shown in Table 6, and are noted as such below in Table 7.

Table 7 Estimated Background Air Quality Values			
Pollutant and Averaging Time	Background Value	California AAQS	National AAQS
Ozone – 1-Hour	0.082 ppm (161.0 μg/m^3)	0.09 ppm (180 μg/m^3)	-
Ozone – 8-Hour	0.068 ppm (133.5 μg/m^3)	0.070 ppm (137 μg/m^3)	0.075 ppm (147 μg/m^3)
PM10 – 24-Hour	56 μg/m^3	50 μg/m^3	150 μg/m^3
PM10 – Annual	24.3 μg/m^3	20 μg/m^3	-
PM2.5 – 24-Hour 3-year Average 98th%	17 μg/m^3	-	35 μg/m^3
PM2.5 – Annual CAAQS	9.4 μg/m^3	12 μg/m^3	-
PM2.5 – Annual NAAQS 3-year Average	9.0 μg/m^3	-	12.0 μg/m^3
NO_2 – 1-Hour CAAQS	0.090 ppm (169.3 μg/m^3)*	0.18 ppm (339 μg/m^3)	-
NO_2 – 1-Hour NAAQS 3-year Average 98th%	0.034 ppm (64.0 μg/m^3)*	-	0.100 ppm (188 μg/m^3)
NO_2 – Annual	0.007 ppm (13.2 μg/m^3)	0.030 ppm (57 μg/m^3)	0.053 ppm (100 μg/m^3)
CO – 1-Hour	3.4 ppm (3,894 μg/m^3)	20 ppm (23,000 μg/m^3)	35 ppm (40,000 μg/m^3)
CO – 8-Hour	2.8 ppm (3,207 μg/m^3)	9.0 ppm (10,000 μg/m^3)	9 ppm (10,000 μg/m^3)
SO_2 – 1-Hour CAAQS	0.011 ppm (28.8 μg/m^3)	0.25 ppm (655 μg/m^3)	-
SO_2 – 1-Hour NAAQS 3-year Average 99th%	0.004 ppm (10.5 μg/m^3)	-	0.075 ppm (196 μg/m^3)
SO_2 – 3-Hour Set Equal to 1-Hour Max	0.011 ppm (28.8 μg/m^3)	-	0.5 ppm (1300 μg/m^3)
SO_2 – 24-Hour	0.002 ppm (5.2 μg/m^3)	0.04 ppm (105 μg/m^3)	-

*Concurrent hourly NO_2 concentrations may be used in the 1-hour NO_2 CAAQS modeling analyses. The 3rd highest seasonal NO_2 concentration for each hour, averaged over the past three years, may be used in the 1-hour NO_2 NAAQS analyses.

For conversion from the ppm measurements to μg/m^3 concentrations typically required for the modeling analyses, used:
μg/m^3 = ppm x 40.9 x MW where MW = 48, 28, 46, and 64 for ozone, CO, NO_2, and SO_2, respectively.

The attainment status of the proposed project site is designated for the NAAQS and CAAQS as follows in Table 8.

Table 8 NAAQS/CAAQS Attainment Status Listing		
Pollutant	NAAQS Status	CAAQS Status
8-Hour Ozone	Nonattainment	Nonattainment
PM10	Unclassified (Attainment)	Nonattainment
PM2.5	Unclassified/Attainment	Unclassified
NO_2	Unclassified/Attainment	Attainment
CO	Unclassified/Attainment	Attainment
SO_2	Unclassified (Attainment)	Attainment

Attainment status according to maps at ARB website http://www.arb.ca.gov/desig/adm/adm.htm.

AIR QUALITY MODELING PROCEDURES

Several dispersion models are proposed for use to quantify pollutant impacts on the surrounding environment based on the emission sources and operating parameters. AERMOD will be used to determine facility impacts on Class II areas in the immediate project vicinity in simple, intermediate, and complex terrain areas during project operations. AERMOD will be the primary model used for comparison of project impacts to SILs and demonstration of compliance with AAQS. Modeling of operational impacts are described below.

For modeling the project's operational impacts under normal and startup, shutdown, or malfunction conditions due to emissions from the proposed sources on nearby simple and complex terrain, the AERMOD model will be used with the entire hourly meteorological data (described above).

AERMOD Model, Options, and Procedures: AERMOD is a steady-state plume dispersion model that simulates transport and dispersion from multiple point, area, or volume sources based on updated characterizations of the atmospheric boundary layer. AERMOD uses Gaussian distributions in the vertical and horizontal for stable conditions, and in the horizontal for convective conditions; the vertical distribution for convective conditions is based on a bi-Gaussian probability density function of the vertical velocity. For elevated terrain AERMOD incorporates the concept of the critical dividing streamline height, in which flow below this height remains horizontal, and flow above this height tends to rise up and over terrain. AERMOD also uses the advanced PRIME algorithm to account for building wake effects. AERMOD input data options are listed below following these USEPA modeling guidance documents.

- Final plume rise
- Stack tip downwash
- Regulatory default option (i.e., calm and missing meteorological data processing and elevated terrain heights option)

Flagpole receptors are not proposed to be used (ground level concentrations will be calculated). AERMAP will be used to calculate receptor elevations and hill height scales for all receptors from NED data in accordance with USEPA guidance. Selection of the receptor grids is discussed below.

NO_2 Modeling Procedures: NO_2 impacts will first be assessed using a conservative Tier 1 analysis, assuming all NOx emissions are converted to NO_2 prior to the modeled impacts. Depending on the magnitude of modeled impacts, both 1-hour and annual NO_2 concentrations may be calculated with a Tier 2 analysis using the Ambient Ratio Method (ARM), adopted in the *Guideline on Air Quality Models*. The Guideline allows a nationwide default conversion rate of 75% for annual NO_2/NOx ratios and 80% for 1-hour NO_2/NOx ratios for the current Tier 2 Method (not to be confused with the proposed ARM2 methodology). ARM may be performed either by using the ARM model option or by multiplying the modeled NOx concentrations by the appropriate ratios. Both the Tier 1 and Tier 2 analyses can be performed without justification to, or prior approval of, the permitting authority.

A Tier 1 or Tier 2 analysis is expected to be sufficient for modeling annual NO_2 impacts for both CAAQS and NAAQS. However, a Tier 3 analysis may be needed to assess 1-hour NO_2 concentrations for comparison with the CAAQS and NAAQS, either the ozone limiting method (OLM) or plume volume molar ratio method (PVRMR). This analysis will use ambient ozone and NO_2 concentrations measured at the Lancaster monitoring site. As the source of the background air quality data to be used in the modeling analysis, Lancaster has been shown above to be representative of the project site. As proposed, the Tier 3 analysis will be used along with the temporal pairing of modeled NOx concentrations with concurrent hourly background ozone data from the Lancaster monitoring site to determine NO_2 concentrations based on either OLM or PVMRM. . The ozone data will be based on the same years as the AERMOD meteorology data. The ozone data will first be processed to remove missing data similar to procedures outlined in the CAPCOA guidance document *"Modeling Compliance of The Federal 1-Hour NO_2 NAAQS"* (October 27, 2011). Compliance with the 1-hour NAAQS may be assessed using the 3rd highest seasonal NO_2 concentration for each hour, averaged over the past three years, as outlined in the USEPA guidance documents. Compliance with the 1-hour CAAQS may be assessed using concurrent hourly NO_2 data from the Lancaster monitoring site consistent with a paired-sum methodology identified in the CAPCOA guidance as Method#11. Background NO_2 concentrations are not needed for the SILs assessment.

In addition to the above methodologies, compliance with the 1-hour NO_2 CAAQS and NAAQS will also include the following methods in accordance with USEPA and CAPCOA guidance documents:

- For assessing the SILs (using the USEPA SIL of 7.5 µg/m3), the overall maximum OLM/PVMRM 1-hour NO_2 impact (without background) will be used for the 1-hour CAAQS while the five-year average of the annual maximum OLM/PVMRM 1-hour NO_2 impacts (without background) will be used for the 1-hour NAAQS.
- In-stack NO_2/NOx ratios will be based on equipment-specific data, the data contained in the CAPCOA document, or the most recent updated data provided on the USEPA SCRAM modeling website.
- AERMOD-default ambient equilibrium NO_2/NOx ratio of 0.9 will be used.
- If OLM is used, the option OLMGROUP ALL will be used.

Justification for Tier 3 NO_2 Analyses: The use of OLM/PVMRM as a Tier 3 analysis requires approval by the permitting authority. This justification is described in detail below. As summarized in the CAPCOA Guidelines as well as through USEPA Policy Memorandum, OLM/PVMRM is proposed based on five selected criteria:

1. **The model has received a scientific peer review:**

   As noted in the USEPA's June 2010 guidance document, because AERMOD is the preferred model for dispersion for a wide range of applications, the alternative model demonstration for use of the OLM/PVMRM options within AERMOD focuses on the treatment of NOX chemistry within the model, and does not need to address basic dispersion algorithms within AERMOD. The chemistry for OLM/PVMRM has been peer-reviewed, as noted by the documents posted on the USEPA's Support Center for

Regulatory Air Modeling web site. The posted documents include *Sensitivity Analysis of PVMRM and OLM in AERMOD* (MACTEC, 2004) and *Evaluation of Bias in AERMOD-PVMRM* (MACTEC, 2005). Both documents indicate that the models appear to perform as expected.

2. **The model can be demonstrated to be applicable to the problem on a theoretical basis:**

As noted in the document entitled "Sensitivity Analysis of PVMRM and OLM In AERMOD" prepared by Roger W. Brode "This report presents results of a sensitivity analysis of the PVMRM and OLM options for NOx to NO_2 conversion in the AERMOD dispersion model. Several single source scenarios were examined as well as a multiple-source scenario. The average conversion ratios of NO_2/NOx for the PVMRM option tend to be lower than for the OLM option and for the Tier 2 option or the Ambient Ratio Method which has a default value of 0.75 for the annual average. The sensitivity of the PVMRM and OLM options to emission rate, source parameters and modeling options appear to be reasonable and are as expected based on the formulations of the two methods. For a given NOx emission rate and ambient ozone concentration, the NO_2/NOx conversion ratio for PVMRM is primarily controlled by the volume of the plume, whereas the conversion ratio for OLM is primarily controlled by the ground-level NOx concentration.

Overall the PVMRM option appears to provide a more realistic treatment of the conversion of NOx to NO_2 as a function of distance downwind from the source than OLM or the other NO_2 screening options (Hanrahan, 1999a; Hanrahan, 1999b). No anomalous behavior of the PVMRM or OLM options was identified as a result of these sensitivity tests."

Based on this report for both OLM/PVMRM appear to be applicable to the problem of NO_2 formation and as noted by the author provides a better estimation of NO_2 impacts compared to other screening options (Tier 1 and 2).

3. **The databases which are necessary to perform the analysis are available and adequate:**

The data needed to conduct an OLM/PVMRM run with hourly (either concurrent or seasonal) background NO_2 data are hourly meteorological data, hourly ozone data, hourly NO_2 data, and in-stack NO_2/NOx ratios. The hourly ozone and meteorological data exist for the same time period in the immediate project vicinity (ASOS meteorological stations and Lancaster air quality monitoring site).

Both the ASOS meteorological and Lancaster air quality monitoring sites are located relatively close to the proposed project location and would be expected to be representative with respect to ambient concentrations and meteorology. Since ozone is a regional photochemical pollutant, the Lancaster air quality monitoring site would be expected to be representative of the modeling area where reactive photochemistry will occur most extensively.

4. **Appropriate performance evaluations of the model have shown that the model is not biased toward underestimates:**

   As noted in *Evaluation of Bias in AERMOD-PVMRM* (MACTEC, 2005), which was prepared by Roger W. Brode, PVMRM has been judged to provide unbiased estimates based on criteria that are comparable to, or more rigorous than, evaluations performed for other dispersion models. At the present time no assessment of bias has been conducted for the OLM algorithm. It has been shown in the sensitivity analysis that OLM provides similar, but slightly more conservative, results than PVMRM. Therefore it is assumed that OLM would also provide an unbiased estimate of the modeled concentrations.

5. **A protocol on methods and procedures to be followed has been established.**
   The methods and procedures outlined in this protocol are proposed for implementation.

GEP Stack Height and Downwash: Stack locations and heights and building locations and dimensions will be input to BPIP-PRIME. The first part of BPIP-PRIME determines and reports on whether a stack is being subjected to wake effects from a structure or structures. The second part calculates direction-dependent "equivalent building dimensions" if a stack is being influenced by structure wake effects. The BPIP-PRIME output is formatted for use in AERMOD input files.

Receptor Selection: Receptor and source base elevations will be determined from United States Geological Survey (USGS) National Elevation Dataset (NED) data. The NED data will be processed with the USEPA-model AERMAP for the receptor locations selected. All coordinates (both sources and receptors) will be referenced to UTM North American Datum 1983 (NAD83, Zone 11). AERMAP is capable of interpolating the elevation data in the NED data for both receptor elevations and hill height scales.

The NED data are available in 1/3-arcsecond (about 10 meter) and 1-arcsecond (about 30 meter) grid node spacing. Areas that contain receptor grids with 100 meter spacing or less between adjacent receptors will use 10 meter NED data. Other areas that contain only receptor grids of greater than 100 meter spacing may utilize 30 meter NED data. For purposes of determining hill height scales, the NED datasets used will extend 5-km past the outside of the coarse receptor grid described below for 30-meter NED data and 2-km past the outside of the intermediate/downwash receptor grids described below for 10-meter NED data.

Cartesian coordinate receptor grids will be used to provide adequate spatial coverage surrounding the project area for assessing ground-level pollution concentrations, to identify the extent of significant impacts, and to identify maximum impact locations. For the full impact analyses, a nested grid will be developed to fully represent the initial location and extent of significance area(s) and maximum impact area(s). The nested grid will be comprised of the following:

- Receptors will be placed along the proposed project fenceline with a spacing of about 10 meters or less between adjacent receptors.
- The downwash receptor grid with a receptor spacing of 20 meters will extend from the project fence line out to 500 meters from the project.

- An intermediate receptor grid with 100-meter receptor spacing will extend from the downwash receptor grid out to 1000 meters from the project.
- The first coarse receptor grid with 200 meter receptor spacing will extend from the intermediate receptor grid outwards to five (5) kilometers (km) from the project in all directions.
- The second coarse grid with 500 meter receptor spacing will extend out ten (10) km from the project in all directions.
- When maximum impacts occur in areas outside the 20 meter spaced receptor grid, additional refined receptor grids with 20 meter resolution will be placed around the maximum impacts and extended as necessary to determine maximum impacts.

Ambient concentrations within the facility fence line will not be calculated.

Screening AERMOD Modeling Analysis: A variety of facility operating conditions (e.g., minimum, maximum, and average ambient temperatures) and a range of source loads will be analyzed to identify which operating condition causes worst-case ambient air impacts. The modeling will be performed for stack characteristics and emissions for all applicable short-term averaging times (pollutants and averaging times with AAQS) using the entire meteorological dataset (described above). The worst-case short-term operating condition(s) so identified will be used in the refined modeling described below. Source characteristics for annual average impacts will be based on average operating conditions (i.e., average annual temperature, average operating load and worst-case annual emissions based on permitted hours of operation for both normal and startup and shutdown conditions).

Refined AERMOD Modeling Analyses: The facility operating conditions producing the worst-case operational impacts in the screening analysis will be further assessed in the refined AERMOD modeling analyses for each pollutant and averaging time of regulatory concern. The purpose of the refined modeling analysis will be to demonstrate that air emissions from the project will not cause or contribute to an AAQS exceedance and will not cause a significant health risk impact. The refined AERMOD modeling analyses are described in detail in the following sections.

Ambient Air Quality Impact Analyses: In evaluating the impacts of the proposed project on ambient air quality, the ambient impacts of the project will be added to background concentrations and compared to the state and national ambient standards for SO_2, NO_2, PM_{10}, $PM_{2.5}$, and CO. The project impacts will also be compared to the EPA modeling significance impact levels (SILs). The AAQS and USEPA SILs are shown in Table 9.

Table 9
SILS and CAAQS/NAAQS

Pollutant and Averaging Time	USEPA SILs	California AAQS	National AAQS
PM10 – 24-Hour	5 μg/m^3	50 μg/m^3	150 μg/m^3
PM10 – Annual	1 μg/m^3	20 μg/m^3	-
PM2.5 – 24-Hour	1.2 μg/m^3 Average of Ann.Maxs	-	35 μg/m^3 Average of Ann.98th%s
PM2.5 – Annual CAAQS	0.3 μg/m^3	12 μg/m^3	-

PM2.5 – Annual NAAQS	0.3 μg/m^3 Average of Annual Impacts	-	12.0 μg/m^3 Average of Annual Impacts
NO_2 – 1-Hour CAAQS	7.5 μg/m^3	339 μg/m^3	-
NO_2 – 1-Hour NAAQS	7.5 μg/m^3 Average of Ann.Maxs	-	188 μg/m^3 Average of Ann.98th%s
NO_2 – Annual	1 μg/m^3	57 μg/m^3	100 μg/m^3
CO – 1-Hour	2000 μg/m^3	23,000 μg/m^3	40,000 μg/m^3
CO – 8-Hour	500 μg/m^3	10,000 μg/m^3	10,000 μg/m^3
SO_2 – 1-Hour CAAQS	7.8 μg/m^3	655 μg/m^3	-
SO_2 – 1-Hour NAAQS	7.8 μg/m^3 Average of Ann.Maxs	-	196 μg/m^3 Average of Ann.99th%s
SO_2 – 3-Hour	25 μg/m^3	-	1300 μg/m^3
SO_2 – 24-Hour	5 μg/m^3	105 μg/m^3	-
Overall maximum impacts will generally be used for pollutants and averaging times where other types of statistical averages are not specified.			

National Ambient Air Quality Standards (NAAQS): In accordance with USEPA guidance (40 CFR part 51, Appendix W, Sections 11.2.3.2 and 11.2.3.3), the highest modeled concentration will be used for comparison with the short-term CO, 3-hour SO2, 24-hour PM10, and most annual SILs. Based on the statistical form of some of the NAAQS, comparison to the 1-hour NO_2, 1-hour SO_2, 24-hour PM2.5, and annual PM2.5 SILs will be based on the five-year average of the maximum annual short-term or annual average impacts. The maximum modeled short-term CO, 3-hour SO_2, 24-hour PM10, annual PM10, and annual NO_2 impacts will be used to assess compliance for these NAAQS (after including the background concentrations shown above). This is conservative for these short-term NAAQS since compliance is normally based on the highest, second-high modeled impact over five years. Based on the statistical form of the other AAQS, the five-year averages of (1) the 98th percentile daily maximum annual 1-hour impacts for NO_2, (2) the 99th percentile daily maximum annual 1-hour impacts for SO_2, (3) the 98th percentile annual 24-hour impacts for PM10, and (4) the annual-averaged PM2.5 impacts will be used for these NAAQS assessments.

California Ambient Air Quality Standards (CAAQS): The highest modeled concentration will be used to demonstrate compliance with all short-term and annual CAAQS and the USEPA SILs applicable to each CAAQS.

CEC Cumulative Impact Assessment: To demonstrate that the emissions from the proposed projects will not cause or contribute to an exceedance of any AAQS, a multi-source cumulative modeling analysis will be conducted in accordance with CEC requirements for all pollutants and averaging times. This analysis will consider both the existing background concentrations, as established by the applicable ambient monitoring data, and the contribution from additional sources which have recently been permitted and which might not be reflected by the existing monitoring data. In addition, if any project impacts exceed the applicable USEPA SILs, the regulatory agencies will be consulted to develop an appropriate Cumulative Impact Assessment Protocol. The emissions sources to be modeled in any multi-source inventory will be determined in consultation with the appropriate agencies and will normally be conducted after the modeling analyses described in this protocol as submitted with the air permit application and CEC filing.

<u>Fumigation Modeling:</u> The SCREEN3 model will used to evaluate inversion breakup fumigation impacts for all short-term averaging periods (24 hours or less). The methodology outlined in EPA-454/R-92-019 (Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised) will be followed for this analysis. Combined impacts for all sources under fumigation conditions will be evaluated.

For sources with plume heights not subject to inversion breakup fumigation, their contributions to fumigation impacts will be determined using SCREEN3 with all meteorological conditions and ignoring terrain at the distance of the maximum fumigation concentration. The fumigation concentration is then combined with the maximum SCREEN3 concentration from the other sources. The combined fumigation concentrations are also compared to the maximum SCREEN3 concentrations under normal dispersion for all meteorological conditions. If fumigation impacts are less than SCREEN3 maxima under normal dispersion, no further analysis is required based on Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised (EPA-454/R-92-019).

If fumigation impacts exceed SCREEN3 maxima, then fumigation impacts longer than 1-hour averages will be evaluated based on Section 4.5.3 of Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised (EPA-454/R-92-019) guidance on converting to 3-, 8- and 24-hour average concentrations.

<u>Screening Health Risk Assessment</u>: A screening health risk assessment will be conducted to evaluate air toxics. The latest version of the Health Risk Assessment Program (HARP version 2.0) and the HARP On-Ramp will be used to characterize risks from the proposed facility. These models, along with options for their use and how they are used, are discussed below. The screening health risk assessment will be conducted in accordance with the procedures developed by the California Air Resources Board and the Office of Environmental Health Hazard Analysis.

The HARP program is a tool that assists with the programmatic requirements of the Air Toxics Hot Spots Program, and it can be used for preparing health risk assessments for other related programs such as air toxic control measure development or facility permitting applications. HARP is a computer based risk assessment program, which combines the tools of emission inventory database, facility prioritization, air dispersion modeling, and risk assessment analysis. Use of HARP promotes statewide consistency in the area of risk assessment, increases the efficiency of evaluating potential health impacts, and provides a cost effective tool for developing facility health risk assessments. HARP may be used on single sources, facilities with multiple sources, or multiple facilities in close proximity to each other.

The HARP On-Ramp program will be used to convert the AERMOD output files into a form that can be used by HARP. The HARP On-Ramp program is basically a post-processor that will take ASCII post files from AERMOD and process these files to calculate acute, chronic, and cancer impacts, identical to the methods used in the current version of HARP.

The screening health risk assessment will be carried out in three steps. First, emissions of toxic air pollutants from the project will be calculated. Next, the HARP On-Ramp subroutine will be used to convert the maximum AERMOD concentration at each receptor due to the operation of the proposed project. The high-resolution receptor grids as derived from the facility AERMOD modeling will then be used in HARP. Finally, the HARP will be used to evaluate acute, chronic and cancer risks through inhalation and non-inhalation pathways based upon the maximum predicted concentration at each receptor. Some of the assumptions used in running the HARP program will be set as follows:

- Emission rates for non-criteria pollutants will be based upon the expected fuel use of the sources.
- Number of residents affected will be based upon the updated 2010 population data for those census tracts or portions of census tracts, which lie within the maximum impact receptor radius of the proposed facility.
- Number of workers affected will be based upon the county average percentage of non-farm workers as compared to the total county population in 2010. This average will be applied to all affected census tracts.
- Deposition velocity is taken to be 0.02 m/s, as recommended by ARB for controlled sources.
- Fraction of residents with gardens is assumed to be 0.052.
- Fraction of produce grown at home is assumed to be 0.052.

The receptor grids used for the HARP risk analyses are similar to those used for the refined modeling, with the addition of sensitive receptors such as schools, day care centers, hospitals, and care facilities. In addition, the point of maximum impact (PMI), maximally exposed individual resident (MEIR), and the maximally exposed individual worker (MEIW) will be shown. A complete list of the discrete sensitive receptors within 1 mile of the facility will be included in the application as well as census tract population data, census tract maps and affected tracts within 6 miles of the facility.

The HARP program results for acute and chronic inhalation and chronic non-inhalation exposures, cancer burden and individual cancer risk (workplace and residential) for the combustion sources will be summarized. Separate calculations will be shown for each type of exposure and risk.

FINAL MODELING SUBMITTAL

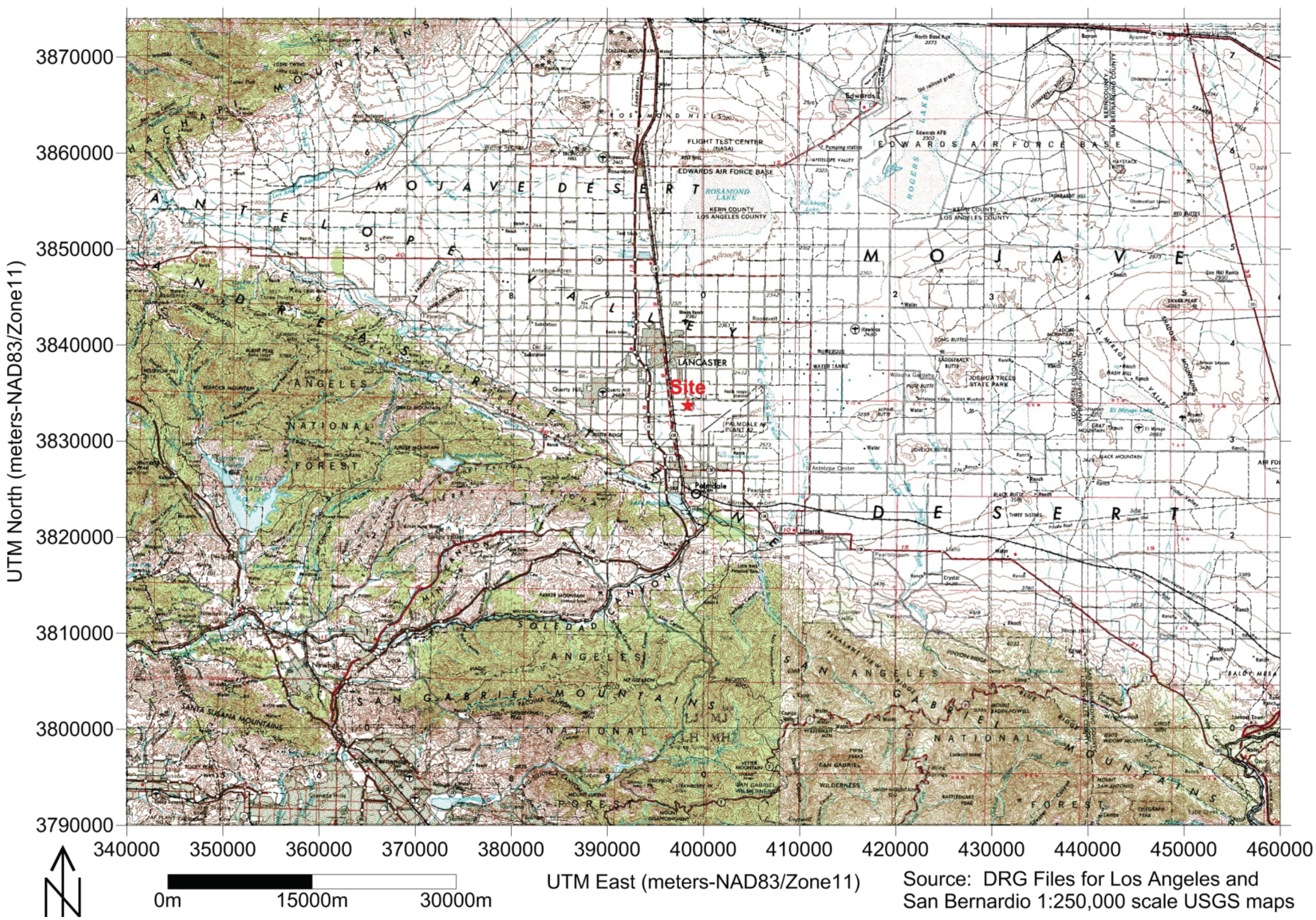
As part of the final modeling analyses, the AVAQMD and CEC will be supplied with the following materials:

- Figure of the local site area taken from nearby US Geological Survey (USGS) 7½’ (1:24,000) map(s) showing the facility, property fenceline, and nearby receptors;

- Figure of the regional area taken from USGS maps showing the outline of all receptor grids modeled;
- All modeling inputs/outputs (including BPIP and meteorological files) on CD-ROM disc, together with a description of all filenames;
- Support data for emissions and project operating parameters; and
- Additional figures and plot plans needed for agency review.

FIGURE 1

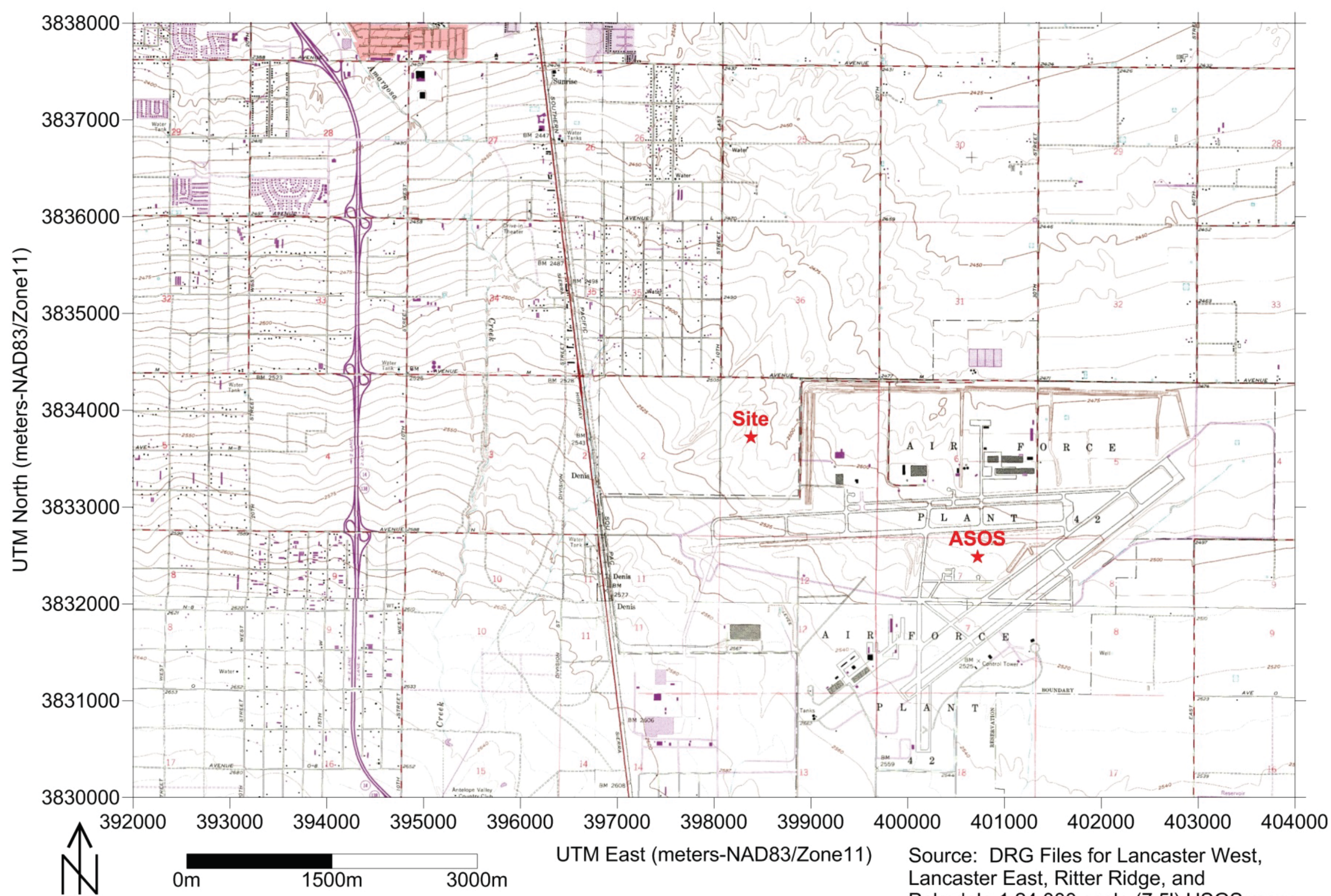
Palmdale Regional Map



Source: DRG Files for Los Angeles and
San Bernardio 1:250,000 scale USGS maps

FIGURE 2

Palmdale Site Vicinity



Source: DRG Files for Lancaster West, Lancaster East, Ritter Ridge, and Palmdale 1:24,000 scale (7.5') USGS maps

FIGURE 3

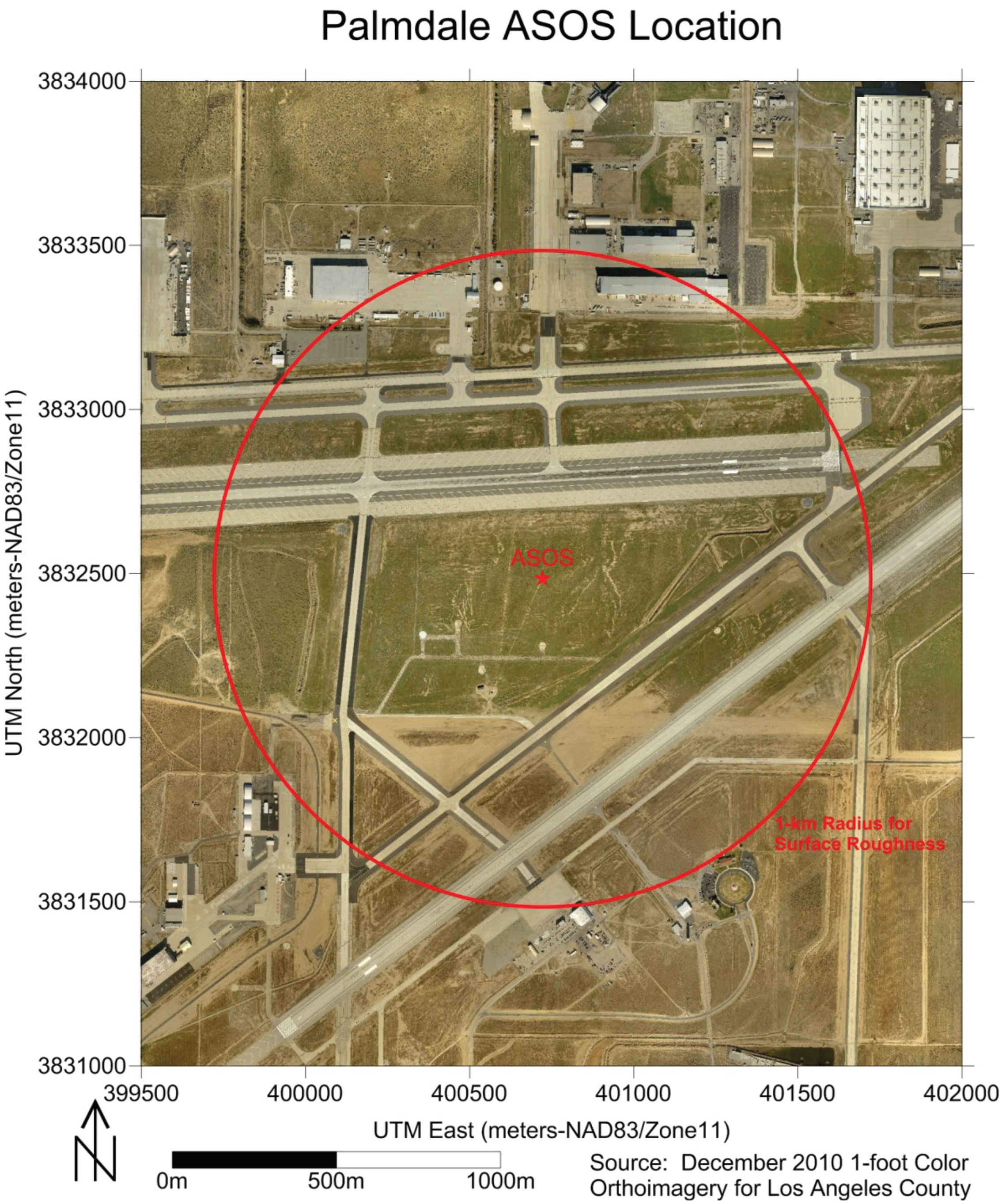
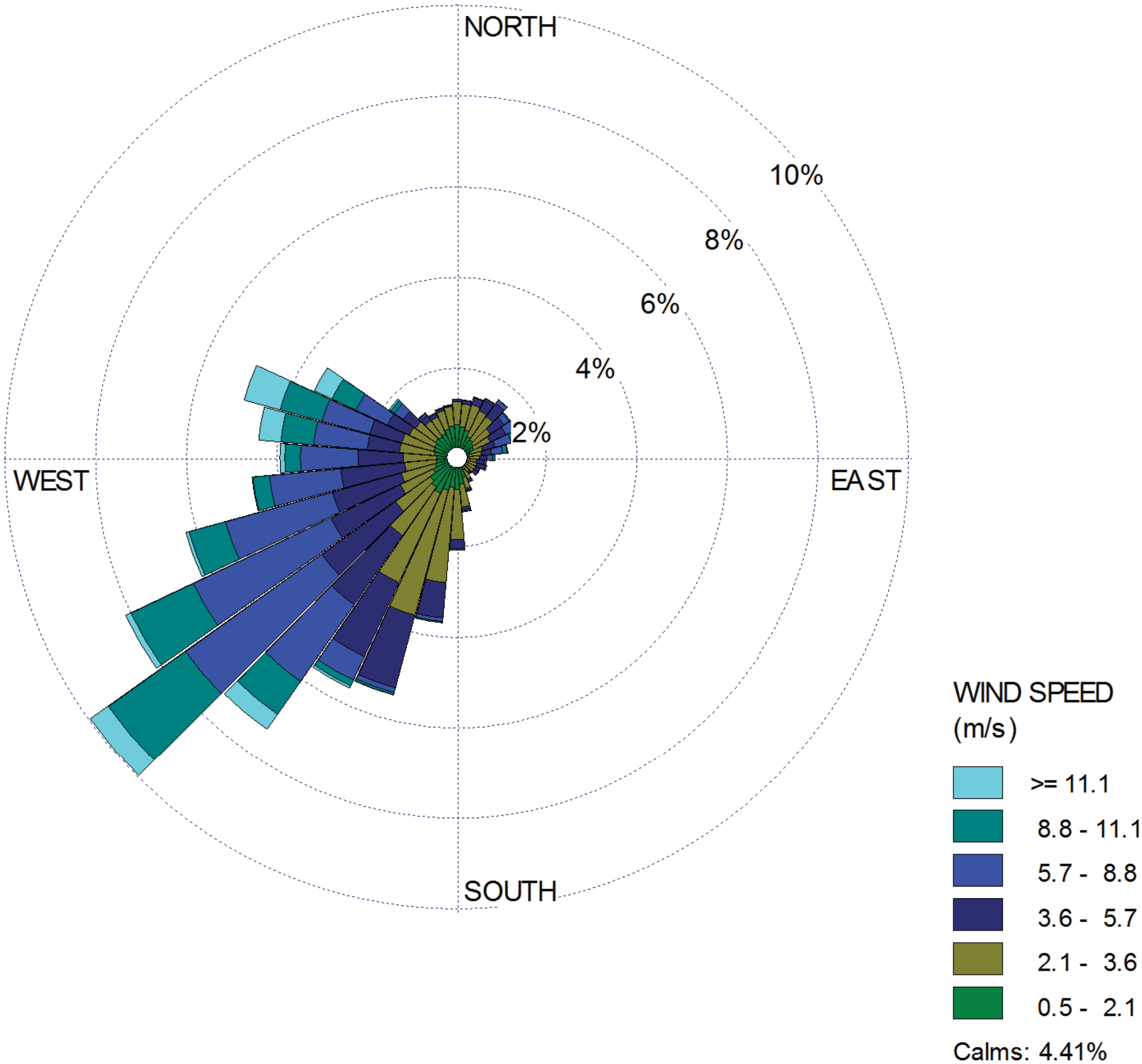

Palmdale ASOS Location
UTM North (meters-NAD83/Zone11)
3834000
3833500
3833000
3832500
3832000
3831500
3831000
399500
400000
400500
401000
401500
402000
UTM East (meters-NAD83/Zone11)
ASOS
1-km Radius for
Surface Roughness
N
0m
500m
1000m
Source: December 2010 1-foot Color
Orthoimagery for Los Angeles County

FIGURE 4
Annual Palmdale Wind Rose (2010-2014)



APPENDIX 4.1D

HEALTH RISK ASSESSMENT SUPPORT DATA

Appendix 4.1D

Health Risk Assessment Support Data

The following tables and figures are presented in this appendix:

- Table 4.1D-1 Census Tract Numbers, Areas, and Population Data
- Table 4.1D-2 Sensitive Receptor Listing for the Near-field Impact Area
- Tables 4.1D-3,4,5 HRA Summary Results
- Figure 4.1D-1 Census Tracts within the 6-mile Radius Distance
- Figure 4.1D-2 Sensitive Receptor Map for the 6-mile Radius Distance
- Attachment 4.1D-1 AB2588 Listings for Lockheed and Northrop Facilities

HARP Version 2.03 risk assessment input and output files are included on the modeling CD.

Table 4.1D-1

Census Tract Data

CENSUS FINDINGS

Map ID	Tract Number	Total Population	Population in Radius	Total Area(sq.mi.)	Area in Radius(sq.mi.)
T1	9009.00	3813	19.0	82.62	0.41
T2	9002.01	1261	123.4	90.96	8.90
T3	9003.00	4514	1055.3	22.79	5.33
T4	9006.05	7100	7100.0	2.04	2.04
T5	9006.02	5214	5214.0	1.97	1.97
T6	9006.09	5243	5243.0	1.03	1.03
T7	9008.03	8284	7268.9	1.02	0.90
T8	9008.04	3489	3489.0	0.57	0.57
T9	9006.08	3536	3536.0	0.52	0.52
T10	9006.06	3721	3721.0	0.67	0.67
T11	9010.04	12544	3149.8	5.06	1.27
T12	9010.08	2874	2814.8	1.04	1.02
T13	9008.05	5089	5089.0	1.02	1.02
T14	9008.06	3620	3620.0	0.69	0.69
T15	9006.07	3904	3904.0	0.66	0.66
T16	9005.08	3334	3334.0	1.54	1.54
T17	9005.07	7669	7669.0	1.52	1.52
T18	9005.06	4352	4352.0	0.51	0.51
T19	9005.05	4002	4002.0	0.51	0.51
T20	9005.01	6764	6764.0	1.20	1.20
T21	9007.01	5289	5289.0	0.81	0.81
T22	9007.03	4375	4375.0	1.00	1.00
T23	9010.09	5318	5318.0	1.03	1.03
T24	9005.04	5816	5816.0	4.08	4.08
T25	9010.11	5069	5069.0	1.03	1.03
T26	9007.04	3050	3050.0	2.00	2.00
T27	9007.05	4285	4285.0	2.04	2.04
T28	9011.02	5557	2984.4	1.97	1.06
T29	9010.10	5913	5913.0	1.03	1.03
T30	9800.04	169	169.0	17.44	17.44
T31	9010.07	2258	2258.0	2.01	2.01
T32	9102.02	5223	5223.0	7.85	7.85
T33	9101.01	1684	888.6	23.65	12.48
T34	9102.01	3549	3549.0	5.62	5.62
T35	9103.01	4219	667.8	1.52	0.24
T36	9103.02	6387	579.4	1.60	0.15
T37	9102.10	7103	7102.9	1.22	1.22
T38	9102.06	3246	257.3	19.45	1.54
T39	9102.09	4397	4317.7	1.13	1.11
T40	9102.08	6340	6340.0	1.27	1.27
T41	9102.07	6023	6023.0	1.71	1.71
T42	9106.01	6460	6460.0	1.02	1.02
T43	9105.02	4086	4086.0	0.77	0.77
T44	9105.01	5339	5339.0	0.58	0.58
T45	9104.02	3751	3751.0	0.44	0.44
T46	9104.01	6608	5852.4	3.77	3.34
T47	9104.03	2235	2235.0	0.48	0.48
T48	9107.11	7585	4941.5	1.39	0.91
T49	9106.02	3995	3995.0	0.77	0.77
T50	9107.13	5324	1512.1	0.77	0.22
T51	9106.05	4535	4535.0	0.52	0.52
T52	9106.03	7075	7075.0	1.01	1.01
T53	9105.04	4797	4797.0	0.61	0.61
T54	9104.04	4130	4130.0	0.99	0.99
T55	9105.05	3064	3064.0	0.62	0.62
T56	9106.06	2970	1996.8	0.53	0.35
T57	9107.07	4329	827.2	2.58	0.49
T58	9102.05	1371	39.2	11.25	0.32

Map ID	Tract Number	Total Population	Population in Radius	Total Area(sq.mi.)	Area in Radius(sq. mi.)
T59	9107.15	6702	488.1	0.77	0.06

Table 4.1D-2 Sensitive Receptor Listing

Sen Recp #	Type	UTM east	UTM north	Elev, ft
1	School	394478	3835333	2482.2
2	School	394493	3837187	2414.4
3	School	396781	3837387	2431.6
4	School	397904	3837306	2437.4
5	School	401938	3838096	2420.7
6	School	394436	3837210	2412.5
7	School	398059	3837904	2431.7
8	School	400787	3837766	2421.8
9	School	403075	3839849	2402.3
10	School	401375	3840379	2392.2
11	School	400928	3840021	2393.8
12	School	399417	3840163	2386.9
13	School	397042	3839387	2393.4
14	School	397337	3840302	2369.8
15	School	396540	3840300	2362.8
16	School	397121	3841336	2352.6
17	School	394098	3839853	2344.5
18	School	391169	3839718	2336.3
19	School	391927	3839153	2345.0
20	School	390544	3838591	2362.1
21	School	389119	3837917	2376.3
22	School	386437	3838503	2370.9
23	School	390591	3837130	2406.8
24	School	391461	3837686	2387.6
25	School	392598	3837672	2386.8
26	School	392800	3837410	2395.0
27	School	386645	3836067	2424.3
28	School	390363	3835822	2447.2
29	Daycare	391956	3835940	2452.7
30	School	387198	3835135	2458.7
31	School	390857	3835095	2482.3
32	Airport	389480	3835030	2451.6
33	School	391365	3834650	2505.9
34	School	388420	3834075	2515.8
35	Detention Cntr	394673	3839132	2364.0
36	USAF PL 42	400576	3832513	2509.2
37	School	396961	3830356	2614.8
38	School	394504	3830342	2659.1
39	School	391618	3828605	2775.9
40	School	394167	3828514	2713.0
41	School	394068	3827778	2760.7
42	School	395048	3828525	2684.4
43	School	396561	3827313	2671.0
44	School	397271	3827955	2639.1
45	School	397970	3828587	2612.1
46	Daycare	400513	3829546	2560.1
47	School	398280	3827018	2639.3
48	School	396369	3826277	2723.1
49	School	398229	3825769	2675.8
50	School	401991	3827447	2591.8
51	Health Fac	403696	3824506	2676.2
52	Health Fac	401162	3825378	2654.7
53	Health Fac	403051	3826908	2610.9
54	Health Fac	400896	3826915	2612.1

Summaries of the various HRA output files are presented below.

Table 4.1D-3 Top Ten Receptor Summary for Cancer Risk

LINE	REC	TYPE	X	Y	CANCER RISK
1	17	ALL	398702	3833866	3.2841858e-06
2	16	ALL	398712	3833866	3.2775134e-06
3	15	ALL	398722	3833866	3.2675356e-06
4	18	ALL	398692	3833866	3.1760296e-06
5	7	ALL	398802	3833867	3.0762004e-06
6	6	ALL	398812	3833867	3.0743760e-06
7	5	ALL	398822	3833867	3.0615161e-06
8	8	ALL	398792	3833867	3.0497543e-06
9	14	ALL	398732	3833867	3.0437144e-06
10	19	ALL	398682	3833866	3.0313849e-06

Table 4.1D-4 Top Ten Receptor Summary for Chronic HI

LINE	REC	TYPE	X	Y	CHRONIC RISK
1	1	ALL	398862	3833867	1.5407601e-02
2	2	ALL	398852	3833867	1.5405484e-02
3	3540	ALL	398860	3833880	1.5359137e-02
4	3611	ALL	398880	3833880	1.5347530e-02
5	3	ALL	398842	3833867	1.5307502e-02
6	3612	ALL	398880	3833900	1.5226780e-02
7	3683	ALL	398900	3833900	1.5186692e-02
8	174	ALL	398862	3833857	1.5176413e-02
9	4	ALL	398832	3833867	1.5113566e-02
10	3755	ALL	398920	3833920	1.5024906e-02

Table 4.1D-5 Top Ten Receptor Summary for Acute HI

LINE	REC	TYPE	X	Y	ACUTE RISK
1	9218	ALL	392500	3825500	2.7114381e-02
2	8842	ALL	388000	3831000	2.6969434e-02
3	9342	ALL	395000	3824000	2.6959682e-02
4	9090	ALL	391000	3826000	2.6707793e-02
5	9263	ALL	393000	3826500	2.5620446e-02
6	9094	ALL	391000	3828000	2.5289651e-02
7	9047	ALL	390500	3826000	2.5146827e-02
8	19	ALL	398682	3833866	2.4956988e-02
9	9281	ALL	393500	3825000	2.4826790e-02

10	9284	ALL	393500	3826500	2.4781059e-02

Cancer Burden Estimate

To evaluate population risk, regulatory agencies have used the cancer burden as a method to account for the number of excess cancer cases that could potentially occur in a population. The population burden can be calculated by multiplying the cancer risk at a census block centroid times the number of people who live in the census block, and adding up the cancer cases across the zone of impact. A census block is defined as the smallest entity for which the Census Bureau collects and tabulates decennial census information; it is bounded on all sides by visible and nonvisible features shown on Census Bureau maps. The centroid is defined as the central location within a specified geographic area.

Cancer burden is calculated on the basis of lifetime (70 year) risks. It is independent of how many people move in or out of the vicinity of an individual facility. The number of cancer cases is considered independent of the number of people exposed, within some lower limits of exposed population size, and the length of exposure (within reason). For example, if 10,000 people are exposed to a carcinogen at a concentration with a 1X10-5 cancer risk for a lifetime the cancer burden is 0.1, and if 100,000 people are exposed to a 1 X 10-5 risk the cancer burden is 1.

There are different methods that can be used as measure of population burden. The number of individuals residing within a 1×10^{-6}, 1×10^{-5}, and/or 1×10^{-4} isopleth is another potential measure of population burden. The approach used herein is based on this method using the 1×10^{-6} isopleth distance and the estimated population values within that established radius.

The distance from the modeling grid center to the $1x10^{-6}$ isopleth is <0.5 miles. For purposes of developing a conservative cancer burden estimate, this distance was increased to a value of 1 mile. This radius distance impacts two (2) census tracts, as follows:

- Tract 9800.04 Population = 169
- Tract 9005.04 Population = 5816

The entirety of each tract is not within the specified radius. A conservative estimate for each tract is 20% of the tract population lies within the defined radius distance. This yields an impacted population of approximately 1197 persons, which results in a cancer burden of 0.0012. Using the full population of both tracts, or 5985 people, results in a cancer burden of 0.0058. Both values are well below the AVAQMD cancer burden significance value of 0.5.

Figure 4.1D-1

Census Tract Map 6 Mile Radius

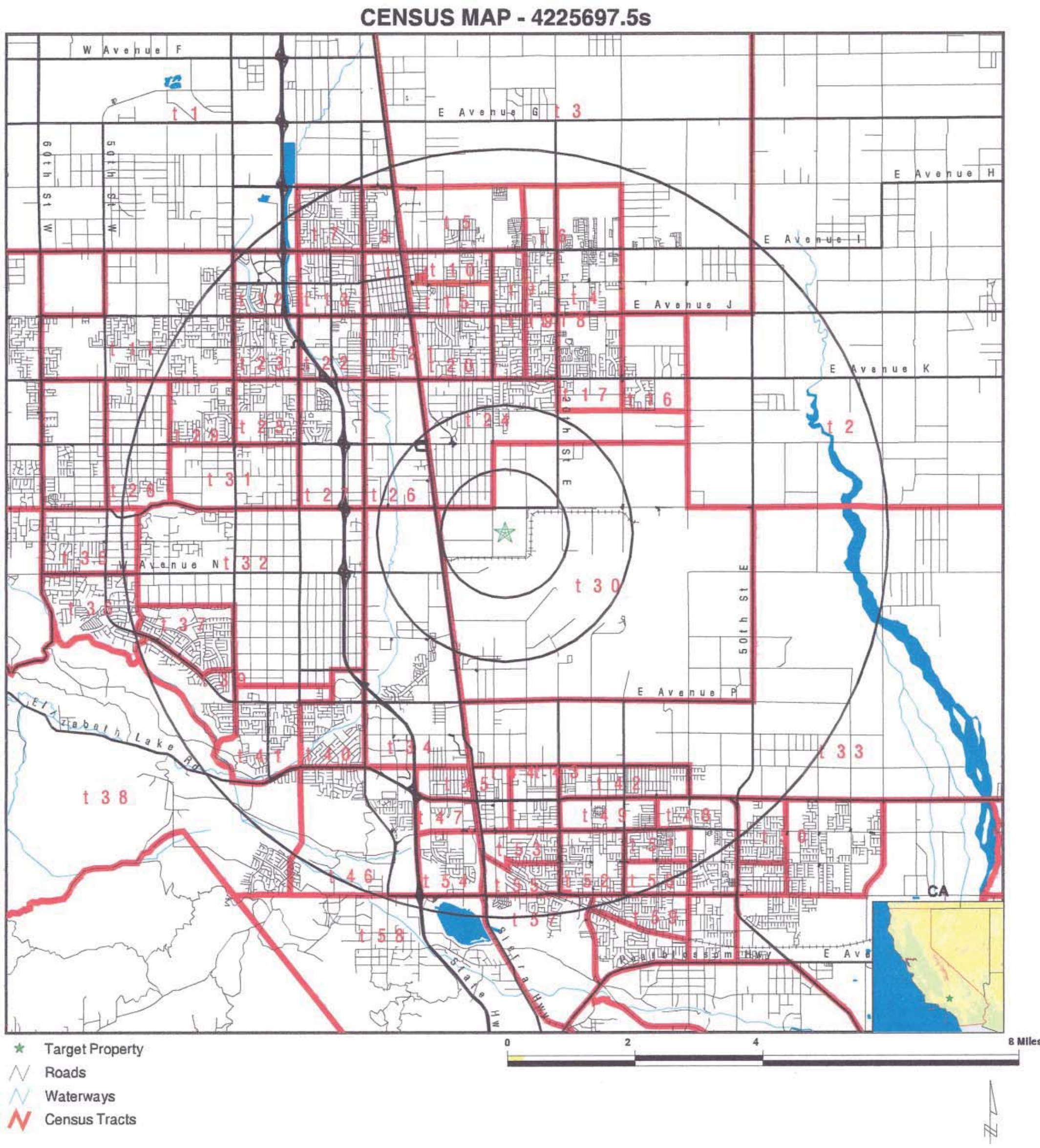
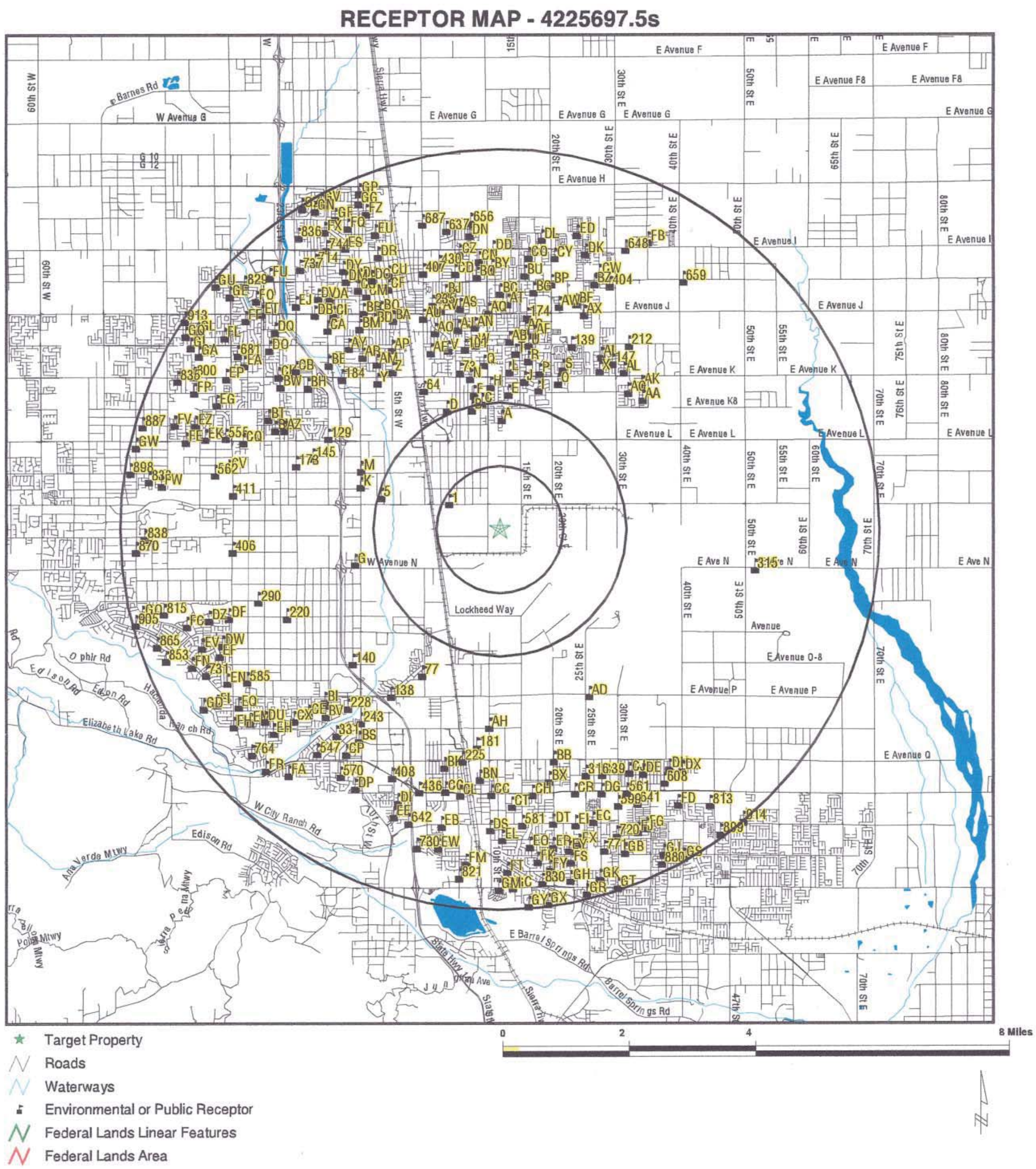


Figure 4.1D-2

Receptor Map 6 Mile Radius



Attachment 4.1D-1

AB2588 Air Toxics EI Listings for the Lockheed Martin and Northrop Grumman Facilities

Attachment 4.1D-1 AB2588 Air Toxics EI Listings for the Lockheed Martin and Northrop Grumman Facilities

Facility Information

Facility Name : Lockheed Martin Aeronautics Company
Street : 1011 Lockheed Way
City : Palmdale
Phone : ( ) -
County : Los Angeles
Air Basin : Mojave Desert
District : Antelope Valley Aqmd

Facility ID : 97001754
SIC Code : 3721
Zip : 93599 771

Facility Prioritization	Inventory Year	Above High Threshold?	District Prioritization Threshold	
			High	Low
Cancer Prioritization		No	10	1
Chronic Prioritization		No	10	1
Acute Prioritization		Yes	10	1

Prioritization scores determine whether a facility must conduct a risk assessment for the "Hot Spots" program. The scores themselves are not an accurate measurement of facility risk.

Health Risk Assessment	Inventory Year	Value	District Notification Level	District RRAP Level
Cancer Risk	2012		10	100
Chronic Hazard Index	2012		1	10
Acute Hazard Index	2012		1	10

The facility health risk assessment (HRA) and prioritization score data were collected under the Air Toxic 'Hot Spots' Program. The risk data, submitted to the ARB, may not have been derived from the same toxic emission data that was reported to CEIDARS. Because the facility may have taken action to reduce risks pursuant to the risk assessment, the risk from the facility may have been substantially reduced since the risk assessment was conducted. To determine if more recent data is available, please contact the district.

Program Status : U

Emissions Data

	Pollutant	Emissions	Unit
Data from 2012	TOG	13.2	Tons/Yr
Download CSV file	ROG	11.5	Tons/Yr
	CO	4.5	Tons/Yr
	NOX	6.5	Tons/Yr
	SOX	0.3	Tons/Yr
	PM	3	Tons/Yr
	PM10	2.6	Tons/Yr
	PM2.5	2.3	Tons/Yr

TOXIC DATA MAY COME FROM VARIOUS YEARS			
Download CSV file	1,2,4TriMeBenze	164.2	Lbs/Yr
	1,3-Butadiene	3	Lbs/Yr
	1,4-Dioxane	0	Lbs/Yr
	2-Nitropropane	0	Lbs/Yr
	2MeNaphthalene	0	Lbs/Yr
	3-MeCholanthren	0	Lbs/Yr
	4,4'IsoprDiPhen	4.6	Lbs/Yr
	7,12-DB[a]anthr	0	Lbs/Yr
	Acenaphthene	0.3	Lbs/Yr
	Acenaphthylene	0.2	Lbs/Yr
	Acetaldehyde	16.3	Lbs/Yr
	Acrolein	5.4	Lbs/Yr
	Acrylic acid	0.1	Lbs/Yr
	Acrylonitrile	0	Lbs/Yr
	Alumin Oxide	0	Lbs/Yr
	Aniline	0	Lbs/Yr
	Anthracene	0.1	Lbs/Yr
	Antim TriOxide	1	Lbs/Yr
	Antimony	0	Lbs/Yr
	Arsenic	0.1	Lbs/Yr
	B[a]P	0	Lbs/Yr
	B[a]anthracene	0	Lbs/Yr
	B[b]fluoranthen	0	Lbs/Yr
	B[g,h,i]perylen	0.1	Lbs/Yr
	B[k]fluoranthen	0	Lbs/Yr
	Barium	2.1	Lbs/Yr
	Barium Chromate	0.4	Lbs/Yr
	Benzene	16.9	Lbs/Yr
	Benzoyl Peroxid	5.1	Lbs/Yr
	Benzyl Chloride	0	Lbs/Yr
	Beryllium	0	Lbs/Yr
	ButylBenzPhthal	0.3	Lbs/Yr
	CI BasicGrn 4	0.1	Lbs/Yr
	Cadmium	0.5	Lbs/Yr
	Chlorobenzn	0	Lbs/Yr
	Chromium	0.7	Lbs/Yr
	Chrysene	0.1	Lbs/Yr
	ClDiFluorMethan	249.4	Lbs/Yr
	Cobalt	0	Lbs/Yr
	Copper	0.5	Lbs/Yr
	Cr(VI)	0	Lbs/Yr
	Cumene	13.5	Lbs/Yr
	Cumene HydPerOx	0.8	Lbs/Yr

Cyclohexane	202.1	Lbs/Yr
DEGBE	7.9	Lbs/Yr
DEGME	2.6	Lbs/Yr
DPGME	0.4	Lbs/Yr
D[a,h]anthracen	0	Lbs/Yr
Di2-EthHxPhthal	3.2	Lbs/Yr
DiButyl Phthal	9.2	Lbs/Yr
DiClBenzenes	0.4	Lbs/Yr
DieselExhPM	367.7	Lbs/Yr
DieselExhTOG	62.8	Lbs/Yr
Diethanolamine	2	Lbs/Yr
EGBE	687.8	Lbs/Yr
EGME	0.3	Lbs/Yr
EGPE	0.9	Lbs/Yr
Epichlorohydrin	0	Lbs/Yr
Epoxy resins	26.4	Lbs/Yr
EtO	0	Lbs/Yr
Ethyl Acrylate	0	Lbs/Yr
Ethyl Benzene	57.9	Lbs/Yr
Ethylene	0	Lbs/Yr
Ethylene Glycol	78.4	Lbs/Yr
Fluoranthene	0.1	Lbs/Yr
Fluorene	0.6	Lbs/Yr
Fluorocarb(Cl)	14.6	Lbs/Yr
Formaldehyde	68	Lbs/Yr
Gasol vapors	134.8	Lbs/Yr
Glycol Ethers	60.7	Lbs/Yr
HCl	28	Lbs/Yr
HF	65.4	Lbs/Yr
HexaMeDiisocyan	0.4	Lbs/Yr
Hexane	36	Lbs/Yr
Hydroquinone	12.4	Lbs/Yr
In[1,2,3-cd]pyr	0	Lbs/Yr
Isocyanates	264.3	Lbs/Yr
Isopropyl Alcoh	9979	Lbs/Yr
Lead	0.5	Lbs/Yr
MEK	769.8	Lbs/Yr
MIBK	1294.1	Lbs/Yr
Manganese	0.4	Lbs/Yr
Me t-ButylEther	6.6	Lbs/Yr
MeDiphenDiisocy	0	Lbs/Yr
Mercury	0.2	Lbs/Yr
Methanol	66.5	Lbs/Yr
Methyl Methacry	43.7	Lbs/Yr

N,N-DiMeAniline	2.5	Lbs/Yr
NH3	74.8	Lbs/Yr
Naphthalene	3.5	Lbs/Yr
Nickel	0.9	Lbs/Yr
Nitric Acid	816.3	Lbs/Yr
PAHs-w/	0.5	Lbs/Yr
PAHs-w/o	0	Lbs/Yr
PGME	23.4	Lbs/Yr
PGMEA	112.6	Lbs/Yr
Phenanthrene	1.2	Lbs/Yr
Phenol	0.7	Lbs/Yr
PhenylGlycEther	0.3	Lbs/Yr
Phosphoric Acid	0	Lbs/Yr
Propylene	198.2	Lbs/Yr
Propylene Oxide	0	Lbs/Yr
Pyrene	0.2	Lbs/Yr
Saccharin	0.3	Lbs/Yr
Selenium	0.3	Lbs/Yr
Silica, Crystln	0	Lbs/Yr
Silver	0.8	Lbs/Yr
Sodium Hydroxid	0	Lbs/Yr
Sodium o-PhPhen	0.1	Lbs/Yr
StrontiumChrom	0.1	Lbs/Yr
Styrene	1.6	Lbs/Yr
Sulfuric Acid	111.6	Lbs/Yr
Toluene	355.9	Lbs/Yr
TolueneDiisocyn	0	Lbs/Yr
TriEthylPhosphn	1	Lbs/Yr
Triethylamine	7	Lbs/Yr
Vanadium	0.9	Lbs/Yr
Vinyl Acetate	0.4	Lbs/Yr
Xylenes	650.4	Lbs/Yr
Zinc	11.5	Lbs/Yr
Zinc Oxide	0.2	Lbs/Yr
n-Butyl Alcohol	150.7	Lbs/Yr
o-Aminoazotolue	0	Lbs/Yr
sec-Butyl Alcoh	331.8	Lbs/Yr
t-Butyl Alcohol	0	Lbs/Yr
t-Butyl acetate	6.5	Lbs/Yr

NO

The emission inventory data provided here may have been developed over several years and is the most recent information available at ARB for this inventory year. Many facilities are only required to update their toxic emission data if there has been an increase in emissions.

Therefore, the toxic emission data presented here should generally be viewed as maximum emission values which may have decreased since this information was reported. If you have questions regarding data updates, please contact the local air district. Note: If this facility has diesel-fueled internal combustion engines, then a portion of the PM10 shown is considered to be diesel exhaust PM10.

[Start a new search]

Facility Information

Facility Name : Northrop Grumman
Street : 3520 E. Avenue M Lpa11/4g
City : Palmdale
Phone : (661) 266-5394
County : Los Angeles
Air Basin : Mojave Desert
District : Antelope Valley Aqmd

Facility ID : 102301816
SIC Code : 3721
Zip : 93550

Facility Prioritization	Inventory Year	Above High Threshold?	District Prioritization Threshold High	District Prioritization Threshold Low
Cancer Prioritization		No	10	1
Chronic Prioritization		No	10	1
Acute Prioritization		No	10	1

Prioritization scores determine whether a facility must conduct a risk assessment for the "Hot Spots" program. The scores themselves are not an accurate measurement of facility risk.

Health Risk Assessment	Inventory Year	Value	District Notification Level	District RRAP Level
Cancer Risk	2012		10	100
Chronic Hazard Index	2012		1	10
Acute Hazard Index	2012		1	10

The facility health risk assessment (HRA) and prioritization score data were collected under the Air Toxic 'Hot Spots' Program. The risk data, submitted to the ARB, may not have been derived from the same toxic emission data that was reported to CEIDARS. Because the facility may have taken action to reduce risks pursuant to the risk assessment, the risk from the facility may have been substantially reduced since the risk assessment was conducted. To determine if more recent data is available, please contact the district.

Program Status : U

Emissions Data

	Pollutant	Emissions	Unit
Data from 2012 Download CSV file	TOG	28.2	Tons/Yr
	ROG	19.5	Tons/Yr
	CO	25.1	Tons/Yr
	NOX	15.8	Tons/Yr
	SOX	0.6	Tons/Yr
	PM	4.3	Tons/Yr
	PM10	3.5	Tons/Yr
	PM2.5	2.7	Tons/Yr

TOXIC DATA MAY COME FROM VARIOUS YEARS			
Download CSV file	1,1,1-TCA	0.1	Lbs/Yr
	1,1,2TriClEthan	0.4	Lbs/Yr
	1,1-DiClEthane	0.3	Lbs/Yr
	1,2,4TriMeBenze	50.9	Lbs/Yr
	1,2-DiClBenzene	0	Lbs/Yr
	1,2-DiClPropane	0.3	Lbs/Yr
	1,2-EpoxyButane	0.1	Lbs/Yr
	1,3-Butadiene	22.8	Lbs/Yr
	1,3-DiClPropene	0.3	Lbs/Yr
	1,4-Dioxane	0	Lbs/Yr
	2,2,4TriMePentn	5.5	Lbs/Yr
	2-Nitropropane	5.9	Lbs/Yr
	2MeNaphthalene	0	Lbs/Yr
	3-MeCholanthren	0	Lbs/Yr
	4,4'IsoprDiPhen	7.4	Lbs/Yr
	4VinylCyclohexe	2.8	Lbs/Yr
	7,12-DB[a]anthr	0	Lbs/Yr
	Acenaphthene	0.5	Lbs/Yr
	Acenaphthylene	0.4	Lbs/Yr
	Acetaldehyde	69.2	Lbs/Yr
	Acrolein	38.1	Lbs/Yr
	Acrylic acid	0	Lbs/Yr
	Alumin Oxide	0	Lbs/Yr
	Aluminum	0.1	Lbs/Yr
	Anthracene	0.2	Lbs/Yr
	Antim TriOxide	0	Lbs/Yr
	Arsenic	1.2	Lbs/Yr
	B[a]P	0	Lbs/Yr
	B[a]anthracene	0	Lbs/Yr
	B[b]fluoranthen	0	Lbs/Yr
	B[g,h,i]perylen	0.1	Lbs/Yr
	B[k]fluoranthen	0	Lbs/Yr
	Barium	0.8	Lbs/Yr
	Barium Chromate	0	Lbs/Yr
	Benzene	86	Lbs/Yr
	Benzoyl Peroxid	6.4	Lbs/Yr
	Beryllium	0	Lbs/Yr
	Biphenyl	1.8	Lbs/Yr
	ButylBenzPhthal	0.2	Lbs/Yr
	CCl4	0.5	Lbs/Yr
	Cadmium	0.4	Lbs/Yr
	Chlorobenzn	15.4	Lbs/Yr
	Chloroform	0.4	Lbs/Yr

Chromium	0.7	Lbs/Yr
Chrysene	0.2	Lbs/Yr
ClDiFluorMethan	136.2	Lbs/Yr
Cobalt	0	Lbs/Yr
Copper	0.8	Lbs/Yr
Cr(VI)	0.4	Lbs/Yr
Cumene	5.5	Lbs/Yr
Cumene HydPerOx	0.9	Lbs/Yr
Cyclohexane	38.3	Lbs/Yr
DEGBE	4.3	Lbs/Yr
DEGDME	0.9	Lbs/Yr
DEGME	8.1	Lbs/Yr
DEGlycol	1.2	Lbs/Yr
DMF	0.4	Lbs/Yr
DPG	3.6	Lbs/Yr
DPGME	1.9	Lbs/Yr
D[a,h]anthracen	0	Lbs/Yr
DiClBenzenes	0.2	Lbs/Yr
DieselExhPM	697.1	Lbs/Yr
EDB	0.6	Lbs/Yr
EDC	0.3	Lbs/Yr
EGBE	6.9	Lbs/Yr
EGEEA	2.9	Lbs/Yr
EGME	0.1	Lbs/Yr
EGPE	7.5	Lbs/Yr
Epichlorohydrin	0.2	Lbs/Yr
EtO	0	Lbs/Yr
Ethyl Benzene	80.8	Lbs/Yr
Ethyl Chloride	0	Lbs/Yr
Ethylene	97.8	Lbs/Yr
Ethylene Glycol	2334.5	Lbs/Yr
Fluoranthene	0.2	Lbs/Yr
Fluorene	1	Lbs/Yr
Formaldehyde	368	Lbs/Yr
Gasol vapors	74.1	Lbs/Yr
GasolExhPM	34	Lbs/Yr
GasolExhTOG	869	Lbs/Yr
Glycol Ethers	51	Lbs/Yr
HCl	4.1	Lbs/Yr
HexaMeDiisocyan	23.9	Lbs/Yr
Hexane	45.7	Lbs/Yr
Hydroquinone	0	Lbs/Yr
In[1,2,3-cd]pyr	0	Lbs/Yr
Isobutyraldehyd	3.3	Lbs/Yr

Isocyanates	14.5	Lbs/Yr
Isopropyl Alcoh	15973.3	Lbs/Yr
Lead	1.3	Lbs/Yr
MEK	526.2	Lbs/Yr
MIBK	18987.1	Lbs/Yr
Manganese	150.5	Lbs/Yr
Me t-ButylEther	24.9	Lbs/Yr
MeDiphenDiisocy	7.1	Lbs/Yr
Mercury	0.4	Lbs/Yr
Methanol	46.6	Lbs/Yr
Methyl Methacry	219.2	Lbs/Yr
Methylene Chlor	0.6	Lbs/Yr
MethyleneBromid	174.4	Lbs/Yr
N,N-DiMeAniline	11.6	Lbs/Yr
NH3	116.6	Lbs/Yr
Naphthalene	6.2	Lbs/Yr
Nickel	1	Lbs/Yr
Nitric Acid	0.5	Lbs/Yr
PAHs-w/	2.4	Lbs/Yr
PGME	97.7	Lbs/Yr
PGMEA	800.6	Lbs/Yr
Perc	0	Lbs/Yr
Phenanthrene	1.9	Lbs/Yr
Phenol	164.6	Lbs/Yr
PhenylGlycEther	0.3	Lbs/Yr
Propionaldehyde	1.4	Lbs/Yr
Propylene	299.1	Lbs/Yr
Pyrene	0.3	Lbs/Yr
Selenium	1.4	Lbs/Yr
Silica, Crystln	0.1	Lbs/Yr
Silver	2.3	Lbs/Yr
StrontiumChrom	0.3	Lbs/Yr
Styrene	78.6	Lbs/Yr
Sulfuric Acid	0.1	Lbs/Yr
T-2,4-diisocyan	0	Lbs/Yr
TetraClEthane	0.5	Lbs/Yr
Toluene	3753.8	Lbs/Yr
TolueneDiisocyn	0	Lbs/Yr
TriEthylPhosphn	1.2	Lbs/Yr
TriMeBenzns	5.4	Lbs/Yr
Triethylamine	0	Lbs/Yr
Vanadium	0.4	Lbs/Yr
Vinyl Acetate	0.6	Lbs/Yr
Vinyl Chloride	0.2	Lbs/Yr

	Xylenes	2487.2	Lbs/Yr
	Zinc	6.4	Lbs/Yr
	n-Butyl Alcohol	24.9	Lbs/Yr
	o-Toluidine	0	Lbs/Yr
	sec-Butyl Alcoh	438.6	Lbs/Yr
	t-Butyl Alcohol	0.2	Lbs/Yr

The emission inventory data provided here may have been developed over several years and is the most recent information available at ARB for this inventory year. Many facilities are only required to update their toxic emission data if there has been an increase in emissions. Therefore, the toxic emission data presented here should generally be viewed as maximum emission values which may have decreased since this information was reported. If you have questions regarding data updates, please contact the local air district. Note: If this facility has diesel-fueled internal combustion engines, then a portion of the PM10 shown is considered to be diesel exhaust PM10.

APPENDIX 4.1E
CONSTRUCTION EMISSIONS AND IMPACT ANALYSIS

APPENDIX 4.1E

Construction Emissions and Impact Analysis

Construction Phases

The current proposed project is very similar to the previous project with only one major difference, i.e., the deletion of the solar component. The applicant has chosen to rely upon the construction emissions estimates for the previous project taking into account the removal of those emissions connected to the solar component. In addition, the applicant believes that the exhaust emissions as previously calculated will be conservative in that the equipment to be used on the new project will represent a mix of newer and cleaner engine types as compared to the previous estimates. These emissions were used to establish construction related impacts.

Construction of the Project is expected to last approximately 23 months. The construction will occur in the following two main phases:

- Site preparation-Phase 1,
- Foundation work, construction/installation of major structures, and installation of major equipment-Phase 2.

The site is approximately 50 acres in size and is located in essentially flat terrain. The site is currently vacant. As such, the site will require minimal grading and leveling prior to construction of the power blocks, support systems, and site buildings. Site preparation (Phase 1) includes initial and finish grading, excavation of footings and foundations, and backfilling operations. Phase 1 will last approximately 1.5 months. After site preparation is finished, the construction (Phase 2) of the foundations and structures is expected to begin. Phase 2 is expected to last for approximately 22 months. Once the foundations and structures are finished, installation and assembly of the mechanical and electrical equipment are scheduled to commence.

Fugitive dust emissions from the construction of the Project will result from:

- Dust entrained during site preparation and finish grading/excavation at the construction site;
- Dust entrained during onsite travel on paved and unpaved surfaces;
- Dust entrained during aggregate and soil loading and unloading operations; and
- Wind erosion of areas disturbed during construction activities.

Combustion emissions during construction will result from:

- Exhaust from the Diesel construction equipment used for site preparation, grading, excavation, and construction of onsite structures;
- Exhaust from water trucks used to control construction dust emissions;
- Exhaust from Diesel-powered welding machines, electric generators, air compressors, and water pumps;
- Exhaust from pickup trucks and Diesel trucks used to transport workers and materials around the construction site;

- Exhaust from Diesel trucks used to deliver concrete, fuel, and construction supplies to the construction site; and,
- Exhaust from automobiles used by workers to commute to the construction site.

Available Mitigation Measures

The following mitigation measures are proposed to control exhaust emissions from the Diesel heavy equipment used during construction of PEP:

- The Applicant will work with the general contractor to utilize to the extent feasible, Environmental Protection Agency (EPA)/Air Resources Board Tier II/Tier III engine compliant equipment for equipment over 100 horsepower.
- Ensure periodic maintenance and inspections per the manufacturers specifications.
- Reduce idling time through equipment and construction scheduling.
- Use California ultralow sulfur diesel fuels (<=15 ppmw Sulfur).

The following mitigation measures are proposed to control fugitive dust emissions during construction of the project:

- The Applicant will have an on-site construction mitigation manager who will be responsible for the implementation and compliance of the construction mitigation program. The documentation of the ongoing implementation and compliance with the proposed construction mitigations will be provided on a periodic basis.
- All unpaved roads and disturbed areas in the Project and Construction Laydown and Parking Area will be watered as frequently as necessary to control fugitive dust. The frequency of watering will be on a minimum schedule of two times per day during the daily construction activity period. Watering may be reduced or eliminated during periods of precipitation.
- On-site vehicle speeds will be limited to 5 mph on unpaved areas within the Project construction site.
- The construction site entrance will be posted with visible speed limit signs.
- All construction equipment vehicle tires will be inspected and cleaned as necessary to be free of dirt prior to leaving the construction site via paved roadways.
- Gravel ramps will be provided at the tire cleaning area.
- All unpaved exits from the construction site will be graveled or treated to reduce track-out to public roadways.
- All construction vehicles will enter the construction site through the treated entrance roadways, unless an alternative route has been provided.
- Construction areas adjacent to any paved roadway will be provided with sandbags or other similar measures as specified in the construction SWPPP to prevent runoff to roadways.
- All paved roads within the construction site will be cleaned on a periodic basis (or less during periods of precipitation), to prevent the accumulation of dirt and debris.

- The first 500 feet of any public roadway exiting the construction site will be cleaned on a periodic basis (or less during periods of precipitation), using wet sweepers or air-filtered dry vacuum sweepers, when construction activity occurs or on any day when dirt or runoff from the construction site is visible on the public roadways.
- Any soil storage piles and/or disturbed areas that remain inactive for longer than 10 days will be covered, or shall be treated with appropriate dust suppressant compounds.
- All vehicles that are used to transport solid bulk material on public roadways and that have the potential to cause visible emissions will be covered, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to minimize fugitive dust emissions. A minimum freeboard height of 2 feet will be required on all bulk materials transport.
- Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) will be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition will remain in place until the soil is stabilized or permanently covered with vegetation.
- Disturbed areas, which are presently vegetated, will be re-vegetated as soon as practical.

Estimation of Emissions with Mitigation Measures

Table's 4.1E-1 through 4.1E-3 show the estimated daily and annual construction emissions estimates (as derived from the previous PHPP project, 08-AFC-9, Section 4.1 and Appendix G.3).

Table 4.1E-1 Estimated Daily Construction Emissions (lbs)

Onsite and Offsite Emissions

Project Component	NO_x	CO	VOC	SO_x	PM10	PM2.5
Onsite	105.8	254.1	20.2	0.1	55.7	16.3
Offsite	58.7	161.6	16.6	0.1	19.0	5.3

Table 4.1E-2 Estimated Annual Onsite Construction Emissions (TPY)

Project Component	NO_x	CO	VOC	SO_x	PM10	PM2.5
Onsite	12.3	32.0	2.4	<0.05	6.6	2.0

Table 4.1E-3 Daily Emissions Estimates for Offsite Linears (lbs)

Project Component	NO_x	CO	VOC	SO_x	PM10	PM2.5
Reclaim water line	90.6	164.6	27.5	0.1	41.9	13.8
Natural gas pipeline	90.6	164.6	27.5	0.1	41.9	13.8

Sanitary wastewater line	24.2	51.0	7.8	0.05	10.1	3.4
Potable water line	24.2	51.0	7.8	0.05	10.1	3.4
T-line Segment 1	219.7	156.1	30.0	0.2	84.1	23.6
T-line Segment 2	255.6	195.4	33.8	0.3	309.7	72.4

Construction emissions are well below the federal general conformity levels for those pollutants for which the project area is deemed non-attainment, i.e., ozone (NOx and VOC precursors), therefore a conformity determination for construction emissions is not required.

Analysis of Ambient Impacts from Facility Construction

Ambient air quality impacts from emissions during the construction of the revised Project were not undertaken due to the following:

- Deletion of the solar component results in an overall significant reduction in both exhaust and fugitive emissions on a daily and annual basis.
- The construction equipment mix will be somewhat cleaner, from an exhaust emissions standpoint, which will result in a reduction of exhaust emissions as compared to the previous project.
- The amount of construction equipment will be significantly less, which results in a further reduction of emissions on a daily and annual basis.

Table 4.1E-4 shows the construction modeling results from the previous project. The impacts from the proposed revised project are expected to be significantly less then these values.

TABLE 4.1E-4 MODELED MAXIMUM CONSTRUCTION IMPACTS (PREVIOUS PROJECT)

Pollutant	Averaging Time	Maximum Construction Impacts ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2 [a]	1-hour Annual	190.9 5.9	139.2 28.2	330 34	339	188 100
SO_2	1-hour 24-hour Annual	2.1 0.1 -	34.1 15.7 -	36.2 15.8 -	655 105 -	196 365 80
CO	1-hour 8-hour	3359 550	3680 1840	7039 2390	23,000 10,000	40,000 10,000
PM10	24-hour Annual[b]	20.7 3.4	86 25	106.7 28.4	50 20	150 -
PM2.5	24 Hour Annual	5.6 1.0	20 8.9	22.6 9.9	- 12	35 15.0

Notes:
1. NO_2 determined with OLM.
2. See Table 4.1-29 from PHPP Section 4.1.

3. Modeled concentration plus background.
4. PM10 and PM2.5 reflect a 10 hr-day from March through October, and an 8 hr-day from November through February.

Construction GHG Emissions

Data presented for the previous PHPP project in the CEC Final Staff Assessment (Air Quality, Section 4.1, page 4.1-90, indicates the following estimated emissions for the construction period by activity. The applicant believes that GHG emissions from the proposed project will be significantly less than the values presented below for the following reasons:

- Deletion of the solar component results in an overall significant reduction in exhaust emissions on a daily and annual basis.
- The construction equipment mix will be somewhat cleaner, from an exhaust emissions standpoint, which will result in a reduction of exhaust emissions as compared to the previous project.
- The amount of construction equipment will be significantly less, which results in a further reduction of emissions on a daily and annual basis.

Table 4.1E-5 Construction Related GHG Emissions Estimates

Construction Source	GHG Emissions, mtCO2e
Combined Cycle Facility	5640
Solar Array Facility (deleted)	0
Reclaimed Water Line	1919
Nat Gas Pipeline	2591
Sewer Line	303
Potable Water Line	121
T-Line Segment 1	3014
T-Line Segment 2	944
Construction Total	**14532**

APPENDIX 4.1F

EVALUATION OF BEST AVAILABLE CONTROL TECHNOLOGY

APPENDIX 4.1F

Evaluation of Best Available Control Technology

To evaluate BACT for the proposed turbines, the guidelines for large combined or cogeneration cycle gas turbines (> 50 MW) as delineated in the District, state, and federal BACT listings were reviewed. The relevant BACT determinations for the project are shown in Table 4.1F-1.

Table 4.1F-1 Proposed BACT Levels for PEP
(Steady State Baseload Operation with and without Duct Firing)

BACT Pollutant	Proposed BACT Limit	Proposed BACT Technology
NO_x	2.0 ppmvd	Dry LNBs with SCR
CO	2.0 ppmvd	CO Catalyst
VOC w/o DB	1.0 ppmvd	CO Catalyst and Sole use of PUC Grade Natural Gas
VOC w/DB	2.0 ppmvd	CO Catalyst and Sole use of PUC Grade Natural Gas
SO_x	<=0.20 grs S/100scf	Sole use of PUC Grade Natural Gas
PM10/PM2.5	<=11.8 lb/hr	Sole use of PUC Grade Natural Gas

Tables 4.1F-2 through 4.1F-5 present summaries of the most recent BACT determinations for combined-cycle turbines (from 2008 through 2015).

Table 4.1F-2 Summary of NO_x BACT Determinations (2000-2011)

Facility	Location	NO_x Limit	Averaging Period	Control	Permit Issuance	Source
Avenal Energy Project	California	2.0 ppm	1hr	SCR	May 2011	PSD Permit
Warren County Power Station	Virginia	2.0 ppm	1hr	SCR/DLN	December 2010	PSD Permit
Carty Power Plant	Oregon	2.0 ppm	3-hr rolling	SCR	Draft December 2010	RBLC # OR-0048
Langley Gulch Power Plant	Idaho	2.0 ppm	3-hr rolling	SCR/DLN	Draft December 2010	RBLC # ID-0018
Live Oaks Power Plant	Georgia	2.5 ppm	3hr	SCR/DLN	April 2010	RBLC # GA-0138
Colusa Generating Station	California	2.0 ppm	1hr	SCR	March 2010	PSD Permit
Victorville II Hybrid Power Project	California	2.0 ppm	1hr	SCR	February 2010	PSD Permit
Madison Bell Energy Center	Texas	2.0 ppm	24-hr rolling	SCR	August 2009	RBLC # TX-0548
Chouteau Power Plant	Oklahoma	2.0 ppm	1hr	SCR/DLN	January 2009	RBLC # OK-0129
Kleen Energy Systems	Connecticut	2.0 ppm	1hr	SCR/LNB	February 2008	RBLC # CT-0151
PSO Southwestern Power Plant	Oklahoma	9.0 ppm		DLN	February 2007	RBLC # OK-0117
FPL West County Energy Center Unit 3	Florida	2.0 ppm	24hr	SCR/DLN	July 2008	RBLC # FL-0303
FMPA Cane Island Power Park	Florida	2.0 ppm	24hr	SCR	September 2008	RBLC # FL-0304
Blythe Energy LLC (Blythe II)	California	2.0 ppm	3hr	SCR/DLN	April 2007	PSD Permit
Elk Hills Power	California	2.5 ppm	1hr	SCR/DLN or SCONOX	January 2006	PSD Permit Modification
Rocky Mountain Energy Center	Colorado	3.0 ppm	1hr	SCR/LNB	May 2006	RBLC # C0-0056
San Joaquin Valley Energy Center	California	2.0 ppm	1hr	SCR/DLN	August 2006	PSD permit
Walnut Energy Center	California	2.0 ppm	1hr	SCR	2004	California Energy Commission
Donald Von Raesfeld Power Plant	California	2.0 ppm	1hr	SCR	2003	California Energy Commission
IDC Bellingham	Massachusetts	1.5 ppm	1hr	SCR	2000	SCAQMD-project cancelled

August 2011 through April 2015 BACT Summary for NO_x

Proposed BACT (Range of Values)	RBLC IDs
2-3 ppm	TX0641, PA0921, PA0286, DE0024, IN0158, TX0618, FL0337, TX0619, TX0620, WY0070, TX0600, TX 0730, TX 0727, TX 0679, TX 0714 CO 0076, TX 0710, WV 0025, TX 0712, TX 0687, TX 0689, NJ 0082, TX 0678, TX 0713, TX 0107, TX 0660, OR 0050, PA
9 ppm	MI0402

Table 4.1F-3 Summary of CO BACT Determinations (2006-2011)

Facility	Location	CO Limit (CO Limit with duct firing)	Averaging Period	Control	Permit Issuance	Source
Avenal Energy Project	California	1.5 ppm (2.0 ppm)	1-hr	Oxidation catalyst	June 2011	PSD Permit
Warren County Power Station	Virginia	1.5 ppm (2.4 ppm with duct burning)	1-hr	Oxidation catalyst/GCP	December 2010	PSD Permit
Langley Gulch Power Plant	Idaho	2.0 ppm	3-hr rolling	Oxidation catalyst/GCP	Draft December 2010	RBLC # ID-0018
Live Oaks Power Plant	Georgia	2.0 ppm	3-hr	Oxidation catalyst/GCP	April 2010	RBLC # GA-0138
Colousa Generating Station	California	3.0 ppm	3-hr	Oxidation catalyst	March 2010	PSD Permit
Victorville II Hybrid Power Project	California	2.0 ppm (3.0 ppm)	1-hr	Oxidation catalyst	February 2010	PSD Permit
Madison Bell Energy Center	Texas	17.5 ppm	1-hr rolling	GCP	August 2009	RBLC # TX-0548
Chouteau Power Plant	Oklahoma	8.0 ppm	1-hr	GCP	January 2009	RBLC # OK-0129
Lamar Power Partners II	Texas	15 ppm	24-hr rolling	GCP	June 2009	RBLC # TX-0547
Patillo Branch Power Plant	Texas	2.0 ppm	3-hr rolling	Oxidation catalyst	June 2009	RBLC # TX-0546
Cane Island Power Park	Florida	8 ppm	24-hr	GCP	September 2008	RBLC # FL-0304
Elk Hills Power	California	4.0 ppm	1-hr	Oxidation catalyst	January 2006	PSD Permit Modification

Kleen Energy Systems	Connecticut	0.9 ppm (1.8 ppm with duct firing)	1-hr	Oxidation catalyst	February 2008	RBLC # CT-0151

August 2011 through April 2015 BACT Summary for CO

Proposed BACT (Range of Values)	**RBLC IDs**
2-4 ppm (1-24 hr average) 1 value at 15 ppm 1 value at 50 ppm	TX0641, PA0921, PA0286, IN0158, TX0618, TX0619, TX0620, TX0600, LA0254, TX 0730, TX 0727, TX 0679, TX 0714 CO 0076, TX 0710, WV 0025, TX 0712, TX 0687, TX 0689, NJ 0082, TX 0678, TX 0713, TX 0107, TX 0660, OR 0050, PA 0298

Table 4.1F-4 Summary of Recent PM BACT Limits for Similar Combined-Cycle, Natural gas-fired CTs (2008-2011)

Facility	Location	PM Limit (PM Limit w/Duct Firing)	Type of PM[1] - Filterable(F), Total(T)	Averaging Period	Control	Permit Issuance	Source
Avenal Energy Project	California	8.91 lb/hr (11.78 lb/hr)	TPM	12-month rolling	Natural Gas Fuel	June 2011	PSD Permit
Warren County Power Station	Virginia	8 lb/hr (14 lb/hr)	TPM_{10}, $TPM_{2.5}$	3-hr	---	December 2010	PSD Permit
Warren County Power Station	Virginia	0.0027 lb/MMBtu (0.0040 lb/MMBtu)	TPM_{10}, $TPM_{2.5}$	3-hr	---	December 2010	PSD Permit
Carty Plant	Oregon	2.5 lb/MMscf	FPM_{10}	---	Clean Fuel	Draft December 2010	RBLC # OR-0048
Langley Gulch Power Plant	Idaho	No limit	FPM_{10}	---	GCP	Draft December 2010	RBLC # ID-0018
Colusa Generating Station	California	13.5 lb/hr	TPM, TPM_{10}	12-month rolling	Natural Gas Fuel	March 2010	PSD Permit
Victorville II Hybrid Power Project	California	12.0 lb/hr (18.0 lb/hr)	TPM, TPM2.5	12-month rolling	Natural Gas Fuel	March 2010	PSD Permit
Chouteau Power Plant	Oklahoma	6.59 lb/hr, 0.0035 lb/MMBtu	TPM	3-hr	Natural Gas Fuel	January 2009	RBLC # OK-0129
Cane Island Power Park	Florida	2 gr S/100 scf	TPM_{10}	---	Fuel Spec	September 2008	RBLC # FL-0304
FPL West County Energy Center Unit 3	Florida	2 gr S/100 scf	$PM/PM_{10}/PM_{2.5}$	---	Fuel Spec	July 2008	RBLC # FL-0303
Plaquemine Cogeneration Facility	Louisiana	33.5 lb/hr, 0.02 lb/MMBtu	FPM_{10}, TPM	---	Clean Fuel	July 2008	RBLC # LA-0136
Aresnal Hill Power Plant	Louisiana	24.23 lb/hr	FPM	---	GCP/Pipeline NG	Mar-08	RBLC # LA-0224
Kleen Energy Systems	Connecticut	11 lb/hr (14.1 lb/hr)	FPM_{10}	---	---	February 2008	RBLC # CT-0151
August 2011 through April 2015 BACT Summary for PM, PM10, PM2.5							
Varying emission rates	BACT based on the use of natural gas						

Table 4.1F-5 Summary of VOC BACT Determinations (4/11 through 4/15)

RBLC IDs	Unit Size Range*	VOC BACT Range, ppm
TX 0730, TX 0714, TX 0710, WV 0025, TX 0712, NJ 0028, TX 0678, TX 0713, IA 0107, TX 0660, PA 0298, PA 0296, MI 0412, TX 0709, MI 0410, OH 0352, MI 0405, PA 0291, VA 0312, TX 0708, PA 0286, OH 0356, IN 0158, DE 0023, TX 0618, FL 0337, PA 0278, TX 0619, TX 0620, WY 0070, TX 0600, LA 0254	MW: 40 – 1160 mmbtu/hr: 647 - 7146	0.7 (1 unit) 1.0 (5 units) 1.4 (2units) 1.5 (1 unit) 2.0 (10 units) 3.0 (1 unit) 4.0 (4 units) BACT Technology-CO Catalyst, Natural gas, and good combustion practices

*some units were sized by MW, while some units were sized by mmbtu/hr.

Air Cooled Condenser (Cooling Tower) BACT

The proposed facility will use dry cooling technology, i.e., an air cooled condenser coupled to a closed loop cooling system. The system has no emissions potential and is exempt from permitting per AVAQMD Rule 291(E)(4)(c). This system represents BACT.

Auxiliary Boiler

The proposed aux boiler is rated at 110 mmbtu/hr (HHV). The aux boiler will be fired exclusively on natural gas, and will be equipped with ultra low NOx burners (ULNB) and flue gas recirculation (FGR). Exhaust concentrations of NO_x and CO will be limited to 9 and 50 ppmvd at 3% O_2 respectively. VOC emissions will be controlled to a level of 0.0050 lb/mmbtu, while PM10/2.5 emissions are estimated to be 0.007 lbs/mmbtu (HHV). These emissions levels meet the achieved in practice BACT limits for limited use small boilers firing clean fuels such as natural gas. Table 4.1F-6 presents a summary of boiler BACT determinations derived from the EPA RBLC and recent CEC aux boiler projects (most recent 5 years).

Table 4.1F-6 Aux Boiler BACT Summary

RBLC ID	Size, mmbtu	NO_x, ppm	CO, ppm	VOC, ppm	SO_x, lb/mmbtu	PM10/2.5, lb/mmbtu
TX0731	106	5.4 (SCR)	50	-	-	-
AK0083	243	9	50	13.5	-	0.0074
TX0712	110	9	-	-	-	-
MS0092	261	-	5 (OxCat)	2250	-	0.005
TX0641	150	16	75	-	-	0.0076
IN0197	218	-	-	-	-	-
TX0708	150	18	75	-	-	-
OH0354	249	107	50	-	-	-
CA1212	110	9	50	-	-	0.8
CA1206	178	7	-	-	-	-
OH0336	-	36	100	13.5	-	0.01
Sutter EC	130	5 (SCR)	50	10	0.003	0.007

1. Some limits were converted from lb/mmbtu to ppm.
2. SO_x BACT based on natural gas fuel use

Fire Pump and Emergency Generator Engines

The fire-pump and emergency generator engines will be fired exclusively on CARB certified ultra low sulfur diesel fuel. In addition these engines will comply with the applicable EPA/CARB Tier emissions limits as well as the emissions standards provisions of NSPS Subpart IIII, and NESHAPS Subpart ZZZZ. These engines are low use devices, and as such the foregoing represents BACT for these systems.

GHG BACT

Proposed GHG BACT for the facility processes is as follows:

Turbines:

1. Use of clean fuels (firing natural gas exclusively in the turbines and duct burners).
2. Maintain compliance with the current California GHG emissions performance standards for baseload power facilities at 1100 lbs CO_2/MW-hr.
3. Maintain heat rates for combined cycle operations (turbines plus duct burners) at levels equal to or less than 7100 btu/kW-hr (HHV), and heat rates for simple cycle operations (without duct burners) at levels equal to or less than 8030 btu/kW-hr (HHV).
4. Compliance with the Lbs CO_2/MWh (net) and heat rate values will be based on 365-day rolling averages.

Auxiliary Boiler:

1. Use of clean fuels (firing natural gas exclusively).
2. Use of good combustion practices, periodic tune-ups, and an automated air intake control system for the boiler.
3. Restricted hours of use in support of turbine operations (standby and startup/shutdown operations).

Diesel-fueled IC Engines (Fire Pump and Generator):

1. Use of California ultra low sulfur diesel fuel.
2. Maintain compliance with EPA and CARB Tier emissions standards as applicable.
3. Restricted use hours for readiness testing.

SF6 Breakers:

1. Use of enclosed-pressurized circuit breakers.
2. Annual SF6 leak rates shall not exceed 0.5% by wt.
3. The breakers will be equipped with a 10% by wt. leak detection system.

Facility GHG Limit: Limit facility-wide CO_2e emissions to less than or equal to

2,143,826 tons/yr (1,948,933 metric tons/yr).

Based upon the previous project GHG BACT analysis, the use of carbon capture and/or sequestration were found to be not technically feasible for the project at its current location, nor were these options found to be cost effective.

APPENDIX 4.1G
OFFSETS/MITIGATION

APPENDIX 4.1G

Offsets/Mitigation

The project will require a AVAQMD Regulation XIII New Source Review (NSR) permit, as specified under Rules 1300-1320. Currently, the AVAQMD air basin is federal and State attainment/unclassified for NO_2, SO_2, PM2.5, and CO. The area is in attainment for the federal PM10 standards, but nonattainment for the 8-hour ozone (O_3) standard. It is also State non-attainment for PM10 and O_3 standards. Based on the values in Table 5.2-9, the new facility will be a major new stationary source per AVAQMD New Source Review (NSR) Regulation XIII.

AVAQMD Regulation XIII, NSR Rule 1302, provides the requirements at which emission levels the offset calculations must be done and thresholds over which emissions must be offset. It also defines which pollutants must be offset, what ratios must be used, and the criteria of what can be used as an emission reduction credit (ERC). If a project meets the requirements of these rules, then the mitigation (i.e., ERC) can be considered to be completely effective since the program has been developed to ensure eventual attainment of the AAQS.

Attachment 4.1G-1 Parts 1 and 2, presents the most recent listing of ERCs currently held in the AVAQMD (March 2015) and MDAQMD (November 2014) emissions banks, respectively.

Based on the projects potential to emit, Rule 1302 would require offsets for NOx, VOCs, as ozone precursors and PM10. The projects potential to emit as well as the offset requirements and offset ratios are listed in Table 4.1G-1. Thus, the PEP, is required to generate or acquire sufficient emission reduction credits to offset the proposed project emissions due to its status as a major source.

TABLE 4.1G-1 OFFSETS/MITIGATION PROPOSED FOR PEP

Emission Reduction Credits - TPY					
	PM_{10}	VOC	NO_x	SO_2	CO
AVAQMD Offset Trigger Thresholds	15	25	25	25	NA
Facility PTE[1]	81.01	51.64	139.99	11.39	351.09
AVAQMD Offset Ratio	1:1	1.3:1	1.3:1	1:1	1:1
Total Offsets Required	81.01	57.13	181.99	0	0
Total Mitigation Required at 1.5:1 Ratio from ERC Transfers > 15 Miles from AVAQMD Boundary	0	77.46	209.99	0	0

[1] Values derived from Section 4.1.
[2] Although the proposed facility is being permitted for full operations, the facility will be operated such that the current level of mitigation credits are not exceeded. As additional mitigation credits are obtained the facility will increase operations to comply with the new level of credits (on an annual basis).

The sources of emission offsets could be from any of the following strategies or combination of strategies. Any required offsets or additional mitigations pursuant to CEQA and/or the District NSR regulations, will be negotiated, acquired, and implemented per the AVAQMD regulations and CEC guidance. These mitigations may be one or a combination of the following strategies:

- Acquisition of existing ERCs from the AVAQMD bank.
- Acquisition of existing ERCs from other District banks within the air basin
- Acquisition of existing ERCs from other District banks outside the air basin
- Generation of PM10 ERCs from road paving
- Inter-pollutant offsets (i.e., NO_x for VOC and VOC for NO_x)

Ozone Precursors NO_x and VOC Offsets

Ozone precursor's offsets of NO_x and VOCs are generally of limited availability within the AVAQMD bank. While opportunities to obtain locally sourced ERCs, the project owner also proposes to secure additional inter-basin ozone precursor ERCs from either the Mojave Desert AQMD (located within the MDAB) or from the San Joaquin Valley AQMD. Both districts regulations allow such an approach. There are meteorological circumstances where ozone and ozone precursor (NOx and VOC) emissions from the SJVAPCD result in significant contributions to ozone violations in the AVAQMD. Therefore, the use of ERCs from the SJVAPCD to mitigate the facility NOx and VOC emissions contribution to existing violations of ozone air quality standards would complies with LORS.

On December 17th, 2013, the AVAQMD adopted a resolution to approve the transfer of certain offsets credited and registered within the Mojave Desert Air Quality Management District (MDAQMD) and the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) to the Antelope Valley Air Quality Management District for potential use as offsetting emissions reductions. The approved ERCs include:

- 150 tons of NOx from the Mojave Desert AQMD
- 60 tons of VOCs from the San Joaquin Valley APCD

For any ERCs proposed for acquisition from the San Joaquin APCD, PEP will provide proof of a contractual arrangement covering sufficient emission reductions in good standing in the SJVAPCD emission reduction credit registry. The AVAQMD will independently verify that the issuance of emission reduction credits by SJVAPCD meets USEPA criteria of being real, quantifiable, permanent, surplus and enforceable. The above noted mitigation strategies were approved for implementation on the previously proposed project, and they are proposed for implementation on the current project. Background for these strategies is presented as follows:

- Health and Safety Code section 40709.6 allows increases in emissions of air pollutants at a stationary source located in one district to be offset by credits from another district in two situations. When both sources are within the same air basin but regulated by different districts, section 40709.6(a) allows for anointer-district credit transfer. When sources are in different air basins, a transfer is still allowed under section 40709.6(a), provided the stationary source to which the emission reductions are credited is located in an upwind district that is classified as being in worse nonattainment status than the downwind district where the credits will be used, and the downwind district is overwhelmingly impacted by emissions transported from the upwind district. The districts involved in the transfer may only consider and approve such offset transfers after considering the impact of the offset on air quality, public health, and the regional economy.

- The current proposed project, like the previous project is located in the AVAQMD which is part of the MDAB. The Air Resources Board (ARB) has found that the MDAB is significantly impacted by emissions from upwind areas such as the San Joaquin Valley APCD and the South Coast AQMD. Pursuant to these findings, ARB has designated AVAQMD as overwhelmingly impacted by transported air pollutants from the SJVAPCD. Therefore, the requirements of HSC 40709.6(a) are met, i.e., AVAQMD is downwind of the SJVAPCD, and AVAQMD is overwhelmingly impacted by emissions from the SJVAPCD.

- HSC section 40709.6(d) requires the transfer of credits to be evaluated for the impacts on air quality, public health, and the economy. The CEC considered each of these issues in the context of the previously proposed project prior to issuing its decision approving the project in 2011. Based on the CEC findings and decision for the previous project, the applicant believes the offset strategies proposed for the revised project meet all the required regulatory requirements.

The project owner will demonstrate to the satisfaction of the AVAQMD and the CEC and that adequate emission reduction credits have been purchased prior to start of construction of the project. The project emissions of 139.99 and 51.64 tons per year of NO_x and VOC, respectively, shall be offset at a ratio of 1.3 to one for ERC's within the MDAB or areas in the SJVAB that are within 15 miles of the AVAQMD western boundary. If ERCs are obtained from locations greater than 15 miles from the western portion of the AVAQMD, an offset ratio of 1.5 to one shall be utilized for those offsets. Table 4.1G-2 lists the amounts of ERCs, based on the appropriate offset ratio, for both NO_x and VOCs.

PM10 and PM10 Precursor (SO_x) Offsets

The District is attainment for the federal PM10 standard. Therefore, there is no regulatory requirement, that the applicant is aware of, that requires the adoption of a PM10 plan, road paving rule, or any other preparatory regulatory action prior to responding to an ERC application for emission reductions resulting from the paving of an existing unpaved road. For the same reason, USEPA approval is not required for any District action involving PM10 credits (1305(B)(3)(d)). Furthermore, the District is attainment for both the federal and state PM2.5 standards, and therefore the PEP is not required to offset its PM2.5 emissions pursuant to the District rules.

The AVAQMD PEP will propose to pave roads in the vicinity of the project in order to generate PM10 ERCs, which will mitigate emissions of PM10 and satisfy the state air quality requirements. Ten existing unpaved road segments have been identified, totaling approximately 22 miles. This includes:

Table 4.1G-2 Road Segments Considered for Paving (PM10 Reduction)

Street Segment	From	To	Jurisdiction	Street Type	Segment Length (Mi.)	ROW Req.	Segment Footprint (Acre)
Ave. B	90th Street W	30th Street W	L.A. County	County Road	Approx. 6.0	40 Ft.	29.1
Ave. S-2	96th Street E	106th Street E	L.A. County	County Road	Approx. 1.0	40 Ft.	4.85
110th Street E	Ave. L	Columbia Way /Avenue M	City of Palmdale	Secondary Arterial	Approx. 1.0	92 Ft.	11.15
40th Street W	Ave. N	Ave N-8	L.A. County	County Road	Approx. 0.5	40 Ft.	1.94
Ave. Q	90th Street E	110th Street E	City of Palmdale	Secondary Arterial	Approx. 2.0	92 Ft.	22.3
Ave. S-6	96th Street E	106th Street E	L.A. County	County Road	Approx. 1.0	40 Ft.	4.85
Ave. T-10	87th Street E	96th Street E	L.A. County	County Road	Approx. 1.0	40 Ft.	4.85
Ave. N-8	Bolz Ranch Road	30th Street W	City of Palmdale	Local Interior St.	Approx. 1.5	60 Ft.	10.91
Ave. G	90th Street E	120th Street E	L.A. County	County Road	Approx. 3.0	40 Ft.	9.70
Carson Mesa Road	El Sastre	Vincent View Road	L.A. County	County Road.	Approx. 1.85	40 Ft.	8.24

Four to five road segments will be paved in order to obtain the quantity of offsets needed for air quality purposes. The Applicant has not specified which of the existing unpaved road segments would be selected, but will do so one (1) year prior to the commencement of construction. Additionally, completion of the road paving will be at least 30 days prior to the commencement of start of construction to the project. Road paving activities will not coincide with facility construction.

Attachment 4.1G-1

Parts 1 and 2

ERC Bank Listings for AVAQMD and MDAQMD

n SCAQMD Cert. 1245,	0	0	0	22	0	pounds per day	6/16/1994	1997
QMD Cert. 1681)	0	0	3	0	0	pounds per day	4/27/1996	1997
QMD Cert. 3105 &	0	0	150	0	0	pounds per day		
D Cert. 658 & 916)	3	5	148	1	0	pounds per day	6/20/1990	1990
NOx)	0	94	0	0	0	pounds per day		
	0	33	0	0	0	pounds per day		
D Cert. AQ005779,	0	5	124	0	0	pounds per day	4/8/1992	1990
	34	1145	138	229	7	pounds per year	9/16/2007	2006
D Cert. S-2990-2 and S-		12000				pounds per year	9/30/2008	2008
		8306				pounds per year	9/30/2008	2008
D Cert. S-3079-2)		6000				pounds per year	12/9/2008	2008
	0	9760	0	0	0	pounds per year		
	0	7539	0	0	0	pounds per year		0
	0	148	0	0	0	pounds per year		0
PCD Cert. N-992-2)	0	8000	0	0	0	pounds per year		0
	0	7090	0	0	0	pounds per year		0
	0	8737	0	0	0	pounds per year		0
	84	307	53	962	7	pounds per year		0

Saeed Sadeghi	2244 Walnut Grove Avenue, Rosemead, CA 91770 MSG01-Quad1A	(626) 302-5345	6/16/1994	FALSE	
Phil Stern	376 Valencia Avenue, Brea, CA 92823	(714) 571-1693	4/27/1996	FALSE	
M. M. Yamada	3520 E. Avenue M, Palmdale CA 93550	(310) 331-7544	6/30/1999	FALSE	
George Jung	1011 Lockheed Way, Palmdale CA 93599	(661) 572-4327	7/8/1999	FALSE	
M. M. Yamada	3520 E. Avenue M, Palmdale CA 93550	(310) 331-7544	12/11/2000	FALSE	
Vannessa Damron	3520 E. Avenue M, Palmdale CA 93550	(661) 272-6279	12/11/2000	FALSE	
George Jung	1011 Lockheed Way, Palmdale CA 93599	(661) 572-4327	9/15/2005	FALSE	
George Jung	1011 Lockheed Way, Palmdale CA 93599	(661) 572-4327	9/17/2007	TRUE	9/17/2007
George Jung	1011 Lockheed Way, Palmdale CA 93599	(661) 572-4327	9/30/2008	FALSE	
George Jung	1011 Lockheed Way, Palmdale CA 93599	(661) 572-4327	11/3/2008	FALSE	
George Jung	1011 Lockheed Way, Palmdale CA 93599	(661) 572-4327	3/24/2009	FALSE	
Vannessa Damron	3520 E. Avenue M, Palmdale CA 93550	(661) 272-6279	12/11/2000	FALSE	
Suzie Quist	1011 Lockheed Way, Palmdale CA 93599	(661) 572-2579	8/23/2010	FALSE	
Suzie Quist	1011 Lockheed Way, Palmdale CA 93599	(661) 572-2579	3/21/2011	FALSE	3/17/2011
George Jung	3520 E. Avenue M, Palmdale CA 93550	(661) 272-6279	9/19/2011	FALSE	
Suzie Quist	1011 Lockheed Way, Palmdale CA 93599	(661) 572-2579	10/18/2011	FALSE	10/18/2011
George Jung	3520 E. Avenue M, Palmdale CA 93550	(661) 272-6279	11/18/2011	FALSE	
Antoinette Picatto	1011 Lockheed Way, Palmdale CA 93599	(661) 572-2579	5/31/2012	FALSE	

4/12/2011

					0	0	0	22	0	pounds per day	Inherited	Wa
					0	0	3	0	0	pounds per day	Inherited	Wa
					0	0	150	0	0	pounds per day	Transferred	Wa
					0	0	148	0	0	pounds per day	Transferred	Wa
					0	94	0	0	0	pounds per day	Transformed	Wa
					0	33	0	0	0	pounds per day	Transferred	
					0	5	124	0	0	pounds per day	Transferred	Wa
7/2/2008	None received	9/9/2008	NOE	9/8/2008	87	366	63	962	7	pounds per year	Shutdown	
						12000				pounds per year	Transferred	Wa
1/27/2009	None received	1/29/2009				8306				pounds per year	Transferred	
5/19/2009	None received	9/25/2009				6000				pounds per year	Transferred	Wa
					0	9760	0	0	0	pounds per year		
					0	7539	0	0	0	pounds per year	Transferred	Wa
5/16/2011	None received				0	7391	0	0	0	pounds per year	Transferred	Wa
					0	8000	0	0	0	pounds per year	Transferred	Wa
					0	7090	0	0	0	pounds per year	Transferred	Wa
					0	8737	0	0	0	pounds per year	Transferred	Wa
					84	307	53	962	7	pounds per year		wa

				Available
				Available
		2/15/2001	Transformed into NOx, see AV0005	Used
				Available
8/29/2001	12/8/2001	12/8/2001	Partially Consumed for new cogeneration systems, see AV0006	Used
6/15/2010	7/19/2010	7/19/2010	Partially consumed for combustion units (B010679, B010699 and B010972), see AV0012	Used
				Available
5/31/2012	9/5/2012	9/5/2012	Partially consumed for permitting action, see AV0018	Used
			Partially consumed for permitting action, see AV0010	Used
			Partially consumed for permitting action, see AV0013	Used
				Available
			Partially consumed for permitting action, this certificate is now void with balance transferred to AV0017	Used
				Used
3/17/2011			Partially consumed for permitting action, see AV0013	Used
				Available
10/18/2011				Available
1/10/2012				
				Available

Available MDAQMD ERCs Report

Cert #	Owner of Emred	Contact Person	Contact Tel	Issued ERCs in pounds per year					Certificate Date
				PM10	NOx	VOC	CO	SOx	
0002	TXI Riverside Cement	Eugene M. Kulesza	(909) 683-6458	25174	1484	12	5849	0	6/17/1998
0009	Southern California Gas Company	Noel P. Muyco	(213) 244-5514	0	86880	0	0	0	1/11/1999
0028	Pacific Gas and Electric Company	Carol Burke	(925) 974-4078	0	50511	0	0	0	5/7/2001
0038	Southern California Gas Company	Thomas Ishii	(213) 244-5440	7	3583	510	0	0	10/25/2001
0045	Blythe Energy, LLC	Larry Carpenter	(212) 921-9099	0	0	77380	0	0	10/29/2002
0049	HDPT c/o Tenaska, Inc.	Larry Carlson		0	0	2500	0	0	7/3/2003
0056	GM&S	Penny C. Gonzales	(602) 624-2348	0	0	0	0	53992	2/24/2004
0060	Northwest Pipe Company	Fritz Gobler	(760) 246-3191	8000	0	0	0	0	9/20/2004
0061	EXECU-CORP	Al Dalomi	(760) 458-9871	17545	0	0	76097	0	9/20/2004
0066	Southern California Logistics Airport Authority	Jon B. Roberts	(760) 246-6115	0	42737	6175	181590	5401	7/8/2005
0068	Pacific Gas & Electric Company	Carol Burke	(415) 973-7694	0	261212	0	442767	0	12/7/2005

Cert #	Owner of Emred	Contact Person	Contact Tel	Issued ERCs in pounds per year					Certificate Date
				PM10	NOx	VOC	CO	SOx	
0072	MCAGCC NREA	Phil Chambers	(760) 830-5674	149536	5210	69	1611	176	4/18/2006
0073	Southern California Logistics Airport Authority	Jon B. Roberts	(760) 955-5029	0	300930	0	0	0	7/10/2006
0076	CalNev Pipeline LLC	Yijin Wang	(714) 560-4886	0	546	0	0	0	9/19/2007
0077	HDPT c/o Tenaska, Inc.	Larry Carlson		83840	0	0	0	0	12/18/2002
0079	World of Leisure	Jon Patterson	(760) 246-3790	0	0	6492	0	0	2/4/2010
0080	The Nutro Company	Edward Skokan	(760) 261-7900	88179	0	0	0	0	2/12/2010
0081	Searles Valley Minerals Operations, Inc.	David J. Mason	(760) 372-2547	24114	33224	1743	20608	4287	4/9/2010
0082	Searles Valley Minerals Operations, Inc.	David J. Mason	(760) 372-2547	20782	177270	0	5152	86	9/10/2010
0083	Southern California Gas Company	Thomas T. Ishii	(213) 244-5440		1284361	13696	50596		12/14/2010
0087	MFG Companies	Perry Bennett	(440) 994-5207	0	0	35620	0	0	11/5/2012
0088	Value Environmental	Paul Zawila	(864) 980-0168	0	0	55307	0	0	4/24/2013
0090	USMCLB	Jim Bustamonte	(760) 577-6413	4898	0	0	0	0	1/21/2014
0093	USMCLB	Jim Bustamonte	(760) 577-6413	0	0	786	0	0	4/15/2014

Cert #	Owner of Emred	Contact Person	Contact Tel	Issued ERCs in pounds per year					Certificate Date
				PM10	NOx	VOC	CO	SOx	
0094	USMCLB	Jim Bustamonte	(760) 577-6413	0	0	4	0	0	4/15/2014
0095	USMCLB	Jim Bustamonte	(760) 577-6413	0	2880	0	0	0	4/15/2014
0096	All American Pipeline	Glen Mears	(661) 368-7919	0	0	0	2164	0	4/15/2014
0097	All American Pipeline	Glen Mears	(661) 368-7919	0	0	0	1304	0	4/15/2014
0098	TXI Riverside Cement	Kenneth Allen	(760) 245-5321	0	0	0	1707913	0	4/15/2014
0099	AltaGas Sonoran Energy Inc.	Christopher Doyle	(604) 623-4797	0	400000	0	0	0	5/27/2014
0100	USMCLB	Jim Bustamonte	(760) 577-6413	586	722	302	2456	0	7/15/2014

APPENDIX 4.1H
CUMULATIVE IMPACTS ANALYSIS PROTOCOL

APPENDIX 4.1H

Cumulative Impacts Analysis Protocol

Potential cumulative air quality impacts may occur or result from the Palmdale Energy Project. In anticipation of the preparation of a cumulative impact analysis, a request has been made to the AVAQMD for the necessary source records (source locations, stack data, and emissions data) for any identified major stationary sources within the designated 8 mile radius. The AVAQMD identified two sources to be included in the cumulative impact assessment. Emissions and stack data for these sources were provided in CARB CEIDARS format. This data was reviewed with air district staff and then used in the cumulative impact analysis discussed in the Air Quality section.

Regional Impacts

Regional air quality impacts are possible for pollutants such as ozone, which involve photochemical processes that can take hours to occur. The Project is required, per the AVAQMD NSR Rule to supply emissions mitigation (see Appendix 4.1G), although additional mitigation for some pollutants may be required by the CEC.

Although the relative importance of VOC and NO_x emissions in ozone formation differs from region to region, and from day to day, most air pollution control plans in California require roughly equivalent controls (on a ton per year basis) for these two pollutants. The change in emissions of the sum of these pollutants, equally weighted, will be used to provide a reasonable estimate of the impact of the Project on ozone levels. The net change in emissions of ozone precursors from the Project will be compared with emissions from all sources within the MDAB (Table 4.1G-1).

Table 4.1G-1 Estimated MDAB Emissions Inventory for 2012 (tons/day)

Source Category	TOG	ROG	CO	NO_x	SO_x	PM10	PM2.5
Total Stationary Sources	71.5	17.3	19.3	74.3	6.8	40.2	15.7
Total Area Sources	45.6	13.8	8.4	1.6	0	81.4	12.8
Total Mobile Sources	38.3	34.5	281.5	97.9	0.9	9.6	7.6
Total Natural Sources	58.9	47.6	171.2	1.1	0.9	16	13.6
Air Basin Total (tons/day)	214.3	113.2	480.4	174.9	8.6	147.2	49.7
Air Basin Total (tons/yr)[1]	**78,220**	**41,318**	**175,346**	**63,839**	**3,139**	**53,728**	**18,141**

Source: CARB, 3/2015. Latest emissions inventory available from CARB is 2012.
[1] based on 365 days/year.

Air quality impacts of fine particulate, PM_{10} and/or $PM_{2.5}$, have the potential to be either regional or localized in nature. On a regional basis, an analysis similar to that proposed above for ozone will be performed, looking at the three pollutants that can form PM_{10} in the atmosphere, i.e., VOC, SO_x, and NO_x, as well as directly emitted particulate matter. AVAQMD regulations will require offsets to be provided for $PM_{10,}$ NOx, and VOC emissions from the project, i.e., the net increases are above the

AVAQMD offset trigger thresholds. Offsets for CO are not required at this time since the modeling impact analysis shows CO impacts well below the applicable standards and other significance levels.

As in the case of ozone precursors, emissions of $PM_{10/2.5}$ precursors are expected to have approximately equivalent ambient impacts in forming $PM_{10/2.5}$, per ton of emissions on a regional basis. Table 4.1G-2 provides the comparison of emissions of the criteria pollutants from the Project with emissions from all sources within the MDAB as a whole.

Table 4.1G-2 Comparison of the Project Emissions to Estimated Inventory for 2012

Category	TOG	ROG[1]	CO	NO_x	SO_x	PM10	PM2.5
Project Emissions (tons/yr)	-	52	351	139	11	81	81
MDAB Total (tons/yr)	78,220	41,318	175,346	63,839	3,139	53,728	18,141
Project % of Air Basin Total (basis Tons/yr)	**-**	**0.12**	**0.20**	**0.22**	**0.37**	**0.15**	**0.46**

[1] Project VOC emissions compared to inventory ROG emissions.

Localized Impacts

Localized impacts from the Project could result from emissions of carbon monoxide, oxides of nitrogen, sulfur oxides, and directly emitted PM_{10}. A dispersion modeling analysis of potential cumulative air quality impacts was performed for all four of these pollutants.

In evaluating the potential cumulative localized impacts of the Project in conjunction with the impacts of existing facilities and facilities not yet in operation but that are reasonably foreseeable, a potential impact area in which cumulative localized impacts could occur was identified as an area with a radius of 8 miles around the plant site. Based on the results of the proposed air quality modeling analyses described above, “significant” air quality impacts, as that term is defined in federal air quality modeling guidelines, will be determined. If the project’s impacts do not exceed the significance levels, no cumulative impacts will be expected to occur, and no further analysis will be required. Otherwise, in order to ensure that other projects that might have significant cumulative impacts in conjunction with the Project are identified, a search area with a radius of 8 miles beyond the project’s impact area will be used for the cumulative impacts analysis. Within this search area, three categories of projects with emissions sources will be used as criteria for identification:

- Projects which have recently commenced operations whose emissions may not be reflected in the ambient monitoring background data, i.e., commenced operations after January 2015.
- Projects which have filed for air pollution permits to construct which have not been issued, but that are reasonably anticipated to be issued, and subsequently constructed and operated.
- Foreseeable (reasonably known) projects that have not, to date, filed any applications for development.

The applicable inclusion dates for each of the above source categories was discussed and approved by the AVAQMD staff. The requested source listings will incorporate these dates. Projects that are existing, and that have been in operation such that their emissions are reflected in the ambient air quality data that has been used to represent background concentrations require no further analysis. The cumulative impacts analysis adds the modeled impacts of selected facilities to the maximum measured background air quality levels, thus ensuring that these existing projects are taken into account.

Projects for which air pollution permits to construct have been issued but that were not operational were identified through a request of permit records from the AVAQMD. The search requested will be performed at two levels. For permits that are considered “major modifications” (i.e., emissions increases greater than 40 tons/year of NO_x or SO_2, 25 tons/year of total suspended particulate, 15 tons/year of PM_{10}), a region within 8 miles of the proposed project site will be evaluated. For projects that had smaller emissions changes, but still greater than 15 tons/year, a region within 8 miles of the proposed project site will also evaluated. Projects that satisfy either of these criteria and that had a permit to construct issued after the applicable inclusion date, will be included in the cumulative air quality impacts analysis. The inclusion date, as noted above, will be selected based on the typical length of time a permit to construct is valid and typical project construction times, to ensure that projects that are not reflected in the current ambient air quality data are included in the analysis. Projects for which the emissions change was smaller than 15 tons/year will be assumed to be *de minimus*, and will not be included in the dispersion modeling analysis.

A list of projects within the project region meeting the above noted criteria was requested from the AVAQMD staff. Results of this request were not available at the time of filing. The cumulative analysis will be supplied at a later date.

Given the potentially wide geographic area over which the dispersion modeling analysis is to be performed, the AERMOD model will be used to evaluate cumulative localized air quality impacts. The detailed modeling procedures, AERMOD options, and meteorological data used in the cumulative impacts dispersion analysis were the same as those described in Section 4.1. The receptor grid will be spaced at 100 meters and cover the area in which the detailed modeling analysis (described above) indicates that the project will have impacts that may exceed any significance levels.

Cumulative Impacts Dispersion Modeling

The dispersion modeling analysis of cumulative localized air quality impacts for the proposed project will be evaluated in combination with other reasonably foreseeable projects and air quality levels attributable to existing emission sources, and the impacts were compared to state or federal air quality standards for significant impact. As discussed above, the highest second-highest modeled concentrations will be used to demonstrate compliance with standards based on short-term averaging periods (24 hours or less).

Supporting information to be used in the analysis includes the following:

- 2012 estimated emissions inventory for the AVAQMD (Table 4.1G-1);
- List of projects resulting from the screening analysis of permit files by the AVAQMD;
- Table delineating location data of sources included in the cumulative air quality impacts dispersion modeling analysis;
- Stack parameters for sources included in the cumulative air quality impacts dispersion modeling analysis; and

- Output files for the dispersion modeling analysis.

APPENDIX 4.1I
DISTRICT PERMITTING FORMS

APPENDIX 4.1I

District Permitting Forms

Pursuant to the AVAQMD Regulation II, the following District permit application forms are included herein:

Form: General Permit Form (applicable to the combustion turbines) 1 for each unit.

Form: IC Engine Forms for the Fire Pump and Gen Set engines

Form: External Combustion Engine (Boiler) for the Auxiliary Boiler

These forms reference data contained in the AFC which is of higher detail than can be input on the actual form. This data is contained in the following specific sections of the AFC:

Section 2.0	Project Description
Section 4.1	Air Quality
Section 4.5	Public Health
Appendices	4.1A through 4.1H

ANTELOPE VALLEY AIR QUALITY MANAGEMENT DISTRICT
43301 Division Street, Suite 206, Lancaster, CA 93535-4649
(661) 723-8070 Facsimile: (661) 723-3450

www.avaqmd.ca.gov
Eldon Heaston
Executive Director

APPLICATION FOR INTERNAL COMBUSTION ENGINE (I.C.E.) ONLY

PLEASE TYPE OR PRINT

REMIT $498.00 WITH THIS DOCUMENT ($175.00 FOR CHANGE OF OWNER)

Section 1: Facility/Owner Information

a. Permit To Be Issued To (Company Name): Palmdale Energy, LLC	b. Federal Tax ID #: 36-4810897
c. Mailing/Billing Address (for above company name) 801 2nd Avenue, Suite 1150, Seattle, WA. 98104	
d. Facility or Business License Name (for equipment location): Palmdale Energy, LLC	
e. Facility Address - Location of Equipment (if same as for company, enter "Same"): 950 East Avenue M, Palmdale, CA. 93550	Facility UTM or Lat/Long:

f. Contact Name/Title: Thomas Johns	Email Address: tjohns@summitpower.com	Phone/Fax #.: 509-926-3585

g. General Nature of Business:

Type of Organization (check one):
☐ Individual Owner ☐ Partnership ☒ Corporation ☐ Utility ☐ Local Agency ☐ State Agency ☐ Federal Agency

Section 2: Nature of Application

Application is hereby made for Authority To Construct (ATC) and Permit To Operate (PTO) the following equipment:
Fire Pump Engine System (see AFC for detailed information)

Application is for: ☒ New Construction ☐ Modification ☐ Change of Owner	For modification or change of owner: Current Permit Number: ______________

Do you claim Confidentiality of Data? ☒ No ☐ Yes (attach explanation; specify which information provided is confidential)

Section 3: Equipment Information

Engine Function: ☐ Prime ☒ Emergency ☐ Low-Use (<80 hr/yr) ☐ Portable ☐ Stand-by (used only when a permitted prime unit is down for maintenance or repair)

Engine Manufacturer: Clark	Engine Model: JU-6H/UF-30	Engine Serial Number:
Year of Manufacture: 2015-2016	Date Installed:	
Rating (BHP): 140	Speed (RPM): 1760	Number of Cylinders: 6

Fuel Type: ☒ CARB Diesel ☐ Natural Gas ☐ Propane/LPG ☐ Gasoline ☐ Digester Gas ☐ Landfill Gas
☐ Other (specify):______________

Alternate Fuel (if applicable) specify: (e.g. Propane backup for Natural Gas engine)

Engine Meter: ☒ Hour Meter ☐ Dedicated Fuel Meter ☐ None

Cycle Type: ☐ two cycle ☒ four cycle | Combustion Type: ☐ Rich Burn ☐ Lean Burn

Check all that apply: ☐ Naturally Aspirated ☒ Turbocharged ☐ Aftercooled ☐ Intercooled ☐ Injection Timing Retarded
☐ Air to Fuel Ratio Controller ☐ Smoke Puff Limiter ☐ Electronic Control Module ☐ Staged Combustion ☐ Direct Fuel Injection
☐ Pre-Combustion Chamber ☐ Piston Scavenging

Add-on Emission Control Technology: ☒ No ☐ Yes: Attach Manufacturer's specifications, CARB Certification or Source Test Data			
If yes: Manufacturer:	Model:	Serial #:	CARB EO#:
Type: ☐ SCR ☐ Non-S CR ☐ Particulate Trap ☐ EGR ☐ Oxidation Catalyst ☐ Other (specify): ________			
Stack Data: Exhaust Stack Height from Ground: 19.5 feet		Exhaust Stack Diameter: .4167 feet	
Stack is: ☐ horizontal ☒ vertical ☐ open ☐ weather cap			
Exhaust Vent Data: Exhaust Temp: 1023 °F		Maximum Exhaust Rate: 755 CFM	

Section 4: Emissions Data

Emission Factor Basis: ☐ Manufacturer ☐ Source Test ☐ AVAQMD Default ☐ USEPA AP-42
☐ Other (please specify): see AFC for emissions data

USEPA Family Name: ____________ CARB Executive Order Number: ____________

Emissions Data: If no add-on controls are installed, enter "same" in Post Control Max. Emissions column

Pollutant	Pre-Control Max. Emissions	Units	Post Control Max. Emissions	Units
NOx				
NMHC				
CO				
PM10				
SOx				

Section 5: Powered Item

This ICE is used to power:

☐ Electrical Generator ☐ Compressor ☒ Pump ☐ Paint Spray Gun ☐ Conveyor or Drive ☐ Fire Pump

☐ Other (specify):____________

PERP Registration Number (if applicable):

Manufacturer:	Model:	Serial #:	Size/Rating:

Section 6: Operation Information

Fuel Consumption at Maximum Rated Load: 9.2 ☒ gal/hour ☐ SCF/hour ☐ MMBtu/hr

Typical Load: % of Maximum Rated Load

Facility Annual Throughput by Quarters (percent):	Expected Operating Hours of IC Engine:
☒ Uniform OR _____% Jan-Mar _____% Apr-Jun _____% Jul-Sep _____% Oct-Dec	1 Hours/Day 1 Days/Week 52 Weeks/Year 52 Total Annual Hours

Section 7: Receptor Information

Distance (Feet) and direction to the property line of closest: Residence: Business: School:

Name of Closest School (K-12): see AFC for sensitive receptor data locations, etc

If the proposed ICE operates within 1,000 feet of a school site and operation results in the emission of hazardous air pollutants, a public notice will be required at the expense of the applicant (CA H&S §42301.6)

*Please note, District Staff may contact you for further information. Failure to provide additional information as requested in a timely manner may result in delays in the processing of this permit application.

Section 8: Certification

I hereby certify that all information contained herein is true and correct.

Thomas Johns	VP Dev	Thomas Johns	7/15/15
Name of Responsible Official	Official Title	Signature of Responsible Official	Date Signed

Telephone Number: 509-926-3585

Email: tjohns@summitpower.com

-For District Use only-

Application Number:	Invoice Number:	Permit Number:	Company/Facility Number

ANTELOPE VALLEY AIR QUALITY MANAGEMENT DISTRICT
43301 Division Street, Suite 206, Lancaster, CA 93535-4649
(661) 723-8070 Facsimile: (661) 723-3450

www.avaqmd.ca.gov
Eldon Heaston
Executive Director

APPLICATION FOR INTERNAL COMBUSTION ENGINE (I.C.E.) ONLY

PLEASE TYPE OR PRINT

REMIT $498.00 WITH THIS DOCUMENT ($175.00 FOR CHANGE OF OWNER)

Section 1: Facility/Owner Information

a. Permit To Be Issued To (Company Name): Palmdale Energy, LLC

b. Federal Tax ID #: 36-4810897

c. Mailing/Billing Address (for above company name): 801 2nd Avenue, Suite 1150, Seattle, WA. 98104

d. Facility or Business License Name (for equipment location): Palmdale Energy, LLC

e. Facility Address - Location of Equipment (if same as for company, enter "Same"): 950 East Avenue M, Palmdale, CA. 93550

Facility UTM or Lat/Long:

f. Contact Name/Title: Thomas Johns

Email Address: tjohns@summitpower.com

Phone/Fax #.: 509-926-3585

g. General Nature of Business:

Type of Organization (check one):
☐ Individual Owner ☐ Partnership ☒ Corporation ☐ Utility ☐ Local Agency ☐ State Agency ☐ Federal Agency

Section 2: Nature of Application

Application is hereby made for Authority To Construct (ATC) and Permit To Operate (PTO) the following equipment:
Emergency Gen Set (see AFC for detailed information)

Application is for:
☒ New Construction ☐ Modification ☐ Change of Owner

For modification or change of owner:
Current Permit Number: ____________

Do you claim Confidentiality of Data? ☒ No ☐ Yes (attach explanation; specify which information provided is confidential)

Section 3: Equipment Information

Engine Function: ☐ Prime ☒ Emergency ☐ Low-Use (<80 hr/yr) ☐ Portable ☐ Stand-by (used only when a permitted prime unit is down for maintenance or repair)

Engine Manufacturer: Caterpillar

Engine Model: 3512C

Engine Serial Number:

Year of Manufacture: 2015-2016

Date Installed:

Rating (BHP): 2011

Speed (RPM): 1800

Number of Cylinders: 16

Fuel Type: ☒ CARB Diesel ☐ Natural Gas ☐ Propane/LPG ☐ Gasoline ☐ Digester Gas ☐ Landfill Gas
☐ Other (specify):____________

Alternate Fuel (if applicable) specify: (e.g. Propane backup for Natural Gas engine)

Engine Meter: ☒ Hour Meter ☐ Dedicated Fuel Meter ☐ None

Cycle Type: ☐ two cycle ☒ four cycle

Combustion Type: ☐ Rich Burn ☐ Lean Burn

Check all that apply: ☐ Naturally Aspirated ☒ Turbocharged ☒ Aftercooled ☐ Intercooled ☐ Injection Timing Retarded
☐ Air to Fuel Ratio Controller ☐ Smoke Puff Limiter ☐ Electronic Control Module ☐ Staged Combustion ☐ Direct Fuel Injection
☐ Pre-Combustion Chamber ☐ Piston Scavenging

Add-on Emission Control Technology: ☒ No ☐ Yes: Attach Manufacturer's specifications, CARB Certification or Source Test Data			
If yes: Manufacturer:	Model:	Serial #:	CARB EO#:
Type: ☐ SCR ☐ Non-S CR ☐ Particulate Trap ☐ EGR ☐ Oxidation Catalyst ☐ Other (specify): ______			
Stack Data: Exhaust Stack Height from Ground: 20 feet		Exhaust Stack Diameter: .6667 feet	
Stack is: ☐ horizontal ☒ vertical ☐ open ☐ weather cap			
Exhaust Vent Data: Exhaust Temp: 759 °F		Maximum Exhaust Rate: 109[illegible] CFM	

Section 4: Emissions Data

Emission Factor Basis: ☐ Manufacturer ☐ Source Test ☐ AVAQMD Default ☐ USEPA AP-42

☐ Other (please specify): see AFC for emissions data

USEPA Family Name: FCPXL78.1NZS CARB Executive Order Number: ______

Emissions Data: If no add-on controls are installed, enter "same" in Post Control Max. Emissions column

Pollutant	Pre-Control Max. Emissions	Units	Post Control Max. Emissions	Units
NOx				
NMHC				
CO				
PM10				
SOx				

Section 5: Powered Item

This ICE is used to power:

☒ Electrical Generator ☐ Compressor ☐ Pump ☐ Paint Spray Gun ☐ Conveyor or Drive ☐ Fire Pump

☐ Other (specify): ______

PERP Registration Number (if applicable):

Manufacturer:	Model:	Serial #:	Size/Rating:

Section 6: Operation Information

Fuel Consumption at Maximum Rated Load: 104.6 ☒ gal/hour ☐ SCF/hour ☐ MMBtu/hr

Typical Load: % of Maximum Rated Load

Facility Annual Throughput by Quarters (percent):	Expected Operating Hours of IC Engine:
☒ Uniform OR _____% Jan-Mar _____% Apr-Jun	0.5 Hours/Day 1 Days/Week 52 Weeks/Year
_____% Jul-Sep _____% Oct-Dec	26 Total Annual Hours

Section 7: Receptor Information

Distance (Feet) and direction to the property line of closest: Residence: Business: School:

Name of Closest School (K-12): see AFC for sensitive receptor data locations, etc

If the proposed ICE operates within 1,000 feet of a school site and operation results in the emission of hazardous air pollutants, a public notice will be required at the expense of the applicant (CA H&S §42301.6)

*Please note, District Staff may contact you for further information. Failure to provide additional information as requested in a timely manner may result in delays in the processing of this permit application.

Section 8: Certification

I hereby certify that all information contained herein is true and correct.

Thomas Johns	VP Dev	[signature]	7/15/15
Name of Responsible Official	Official Title	Signature of Responsible Official	Date Signed

Telephone Number: 509-926-3585 Email: tjohns@summitpower.com

-For District Use only-

Application Number:	Invoice Number:	Permit Number:	Company/Facility Number

Antelope Valley Air Quality Management District

43301 Division Street, Suite 206, Lancaster, CA 93535-4649
661.723.8070 FAX 661.723.3450
www.avaqmd.ca.gov

Application for External Combustion Engine (boiler, etc.) Only

Please type or print.

Please remit $498 ($175 for change of owner).

1. Permit to be Issued to (name of company to receive permit): Palmdale Energy, LLC	**1a. Federal Tax ID #:** 36-4810897
2. Mailing/Billing Address (for the above company name): 801 2nd Avenue, Suite 1150, Seattle, WA. 98104	
3. Facility or Business Name on License (for equipment location): Palmdale Energy, LLC	
4. Facility Address/Location of Equipment (if same as company, enter "Same"): 950 East Avenue M, Palmdale, CA. 93550	**Facility UTM or Lat/Long:**

5. Contact Name and Title: Thomas Johns, VP Dev	**E-mail Address:** tjohns@summitpower.com	**Phone and Fax #s:** 509-926-3585

6. Application is hereby made for the Authority to Construct (ATC) and Permit to Operate (PTO) the following equipment:

Auxiliary Boiler (see AFC for detailed information)

7. Application is for:
☒New Construction ☐Modification* ☐Change of Owner*

***For modification or change of owner:**
Current permit #: ______________

8. Type of Organization (check one):
☐ Individual Owner ☐Partnership ☒Corporation ☐Utility ☐Local Agency ☐State Agency ☐Federal Agency

9. Distances (feet and direction to closest):
Fenceline ______________ Residence ______________ Business ______________ School ______________

10. General Nature of Business: Electric power production	**11. Principal Product:** Electrical power

12. Facility Annual Throughput by Quarters (percent):

Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
25 %	25 %	25 %	25 %

13. Expected Facility Operating Hours:

Hrs/Day	Days/Wk	Wks/Yr	Total Hrs/Yr
24	7	52	8000

14. Do you claim Confidentiality of Data? (If yes, state nature of data in an attachment.) ☐Yes ☐No

15. Machine Information:

Check One:
☒Boiler ☐Dryer ☐Furnace ☐Heater ☐Kiln ☐Oven ☐Other (specify): ______________

Manufacturer: Cleaver Brooks or equivalent

Model #: ______________ Serial #: ______________

Maximum heat input rating (use Higher Heating Value): 110 MMBtu/hr or kW

Burner Manufacturer: ______________ Burner Model #: ______________

# of Burners: ______________ Burner max heat input rating: ______________ MMBtu/hr or kW

Percent excess air (or n/a): ______________ Operating temps (C or F): Av. ______________ Max. ______________

Specify Primary Fuel (attach fuel analysis for these fuels, specifying HHV and sulfur content):
☒Natural Gas ☐LPG (Propane) ☐CARB Diesel ☐Coal* ☐Petroleum Coke* ☐Digester Gas*
☐Landfill Gas* ☐Refinery Gas* ☐Other* (specify): see AFC for fuel analysis

Max hourly primary fuel usage: 0.1074 Fuel units (ft^3, gal, etc.) mmscf/hr

If secondary fuel is proposed, specify: ______________ Max hourly usage: ______________

Feedstock type and max process rate (specify units): ______________

Antelope Valley Air Quality Management District

43301 Division Street, Suite 206, Lancaster, CA 93535-4649
661.723.8070 FAX 661.723.3450
www.avaqmd.ca.gov

Application for External Combustion Engine (boiler, etc.) Only

Unit lat/long or UTM coordinates: see AFC Air Quality section and appendices for detailed information on emissions, stack parameters, etc

Max annual hours: 4884 Exhaust stack height (feet): ______ Inside diameter (inches) ______

16. Emissions Controls:
Check all that apply:
☒Low NOx Burner ☐Oxygen Trim ☒Flue or Exhaust Gas Recirculation (FGR or EGR) ☐Oxidation Catalyst ☐Selective Catalytic Reduction (SCR) ☐Selective Non-Catalytic Reduction (SNCR) ☐Afterburner ☐ESP ☐Baghouse
☐Other (specify): ______

17. Max Emissions Rates (controlled): see AFC Air Quality section and Appendix 5.2A for emissions data

Pollutant	Concentration (ppmvd or gr/dscf)	Mass (pounds/hr)
1. Oxides of Nitrogen (NOx)	see AFC	see AFC
2. Oxides of Sulfur (SOx)		
3. Carbon Monoxide (CO		
4. Total Particulates (TSP or PM30)		
5. Coarse Respirable Particulates (PM2.5)		
6. Total Organics (TOG)		
7. Volatile Organic Compounds (VOC, ROG, or NMOG)		

18. Dryers Only:
Check one:
☐Centrifugal ☐Chip ☐Fluidized Bed ☐Rotary ☐Spray ☐Other (specify): ______

19. Furnace Only:
Check one:
☐Annealing ☐Burnoff ☐Calcining ☐Crucible ☐Cupola ☐Diffusion ☐Electric ☐Forge ☐Pot ☐Holding ☐Heat Treating ☐Melting ☐Reverbatory ☐Rotary ☐Sweating ☐Oxide Growth

20. Oven Only:
Check one:
☐Bakery ☐Baking ☐Curing ☐Drying ☐Fluidized Bed ☐Stripping ☐Solder Reflow
☐Roasting, specify type: ______

Firing Method: ☐Direct ☐Indirect

Signature of Responsible Official:		Official Title:
Thomas Johns		VP Development
Typed or Printed Name of Responsible Official: Thomas Johns	**Phone Number:** 509-926-3585	**Date Signed:** 7/15/15

For District Use Only

Application #:	Invoice #:	Permit #:	Company/Facility #:

Antelope Valley Air Quality Management District

43301 Division Street, Suite 206, Lancaster, CA 93535-4649
661.723.8070 FAX 661.723.3450
www.avaqmd.ca.gov

Application for Authority to Construct and Permit to Operate

Please type or print. **Please remit $498 ($175 for change of owner).**

1. Permit to be Issued to (name of company to receive permit): Palmdale Energy, LLC

1a. Federal Tax ID #: 36-4810897

2. Mailing/Billing Address (for the above company name): 801 2nd Avenue, Suite 1150, Seattle, WA. 98104

3. Facility or Business Name on License (for equipment location): Palmdale Energy, LLC

4. Facility Address/Location of Equipment (if same as company, enter "Same"): 950 East Avenue M, Palmdale, CA. 93550

Facility UTM or Lat/Long:

5. Contact Name and Title: Thomas Johns

E-mail Address: tjohns@summitpower.com

Phone and Fax #^{s}: 509-92603585

6. Application is hereby made for the Authority to Construct (ATC) and Permit to Operate (PTO) the following equipment:
Combined cycle Gas turbine/HRSG #2 (see AFC for detailed information)

7. Air Pollution Control Equipment, if any*:
SCR and CO Oxidation Catalyst

(*Note that most APCEs require a separate application.)

8. Application is for:
☒ New Construction ☐ Modification* ☐ Change of Owner*

***For modification or change of owner:**
Current permit #: ______

9. Type of Organization (check one):
☐ Individual Owner ☐ Partnership ☒ Corporation ☐ Utility ☐ Local Agency ☐ State Agency ☐ Federal Agency

10. Distances (feet and direction to closest):
Fenceline ______ Residence ______ Business ______ School ______

11. General Nature of Business: Electricity production

12. Principal Product: Electricity

13. SIC Code (if known): 4911

14. Facility Annual Throughput by Quarters (percent):

Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
25 %	25 %	25 %	25 %

15. Expected Facility Operating Hours:

Hrs/Day	Days/Wk	Wks/Yr	Total Hrs/Yr
24	7	52	8000

16. Do you claim Confidentiality of Data? (If yes, state nature of data in an attachment.) ☐ Yes ☒ No

Antelope Valley Air Quality Management District
43301 Division Street, Suite 206, Lancaster, CA 93535-4649
661.723.8070 FAX 661.723.3450
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Application for Authority to Construct and Permit to Operate

17. Stack Emissions Information

Stack #	Stack Height[1]	Stack Diameter[2]	Exhaust Temp.[3]	Exhaust Flow Rate[4]	Exhaust Velocity[5]
1	see AFC	for detailed	information		
2					
3					

**List additional stacks on a separate sheet as needed.

Measurements Key:

1. Stack height is the distance in feet above ground level to discharge point.
2. Stack diameter is the diameter (or equivalent circular diameter) of discharge point (nearest tenth foot). If using cross-sectional area (A in square feet), equivalent diameter is D = (1.273A)^0.5
3. Exhaust temp. in degrees F, actual or estimated to nearest 50 degree F.
4. Exhaust flow rate at discharge point in actual cubic feet per minute (ACFM).
5. Exhaust velocity in feet per second, design or measured.

18. Remarks

This section may include your basis for confidentiality, process description, modification description, and so forth. If you wish to specify process information as proprietary or confidential, use this space. Note that the kinds and rates of emissions cannot be held confidential and that emissions are subject to public disclosure. Attach additional sheets as needed.

see AFC Air Quality section and Appendices 5.2A through 5.2H

Signature of Responsible Official:		Official Title:
Thomas Johns		VP Dev
Typed or Printed Name of Responsible Official:	**Phone Number:**	**Date Signed:**
Thomas Johns	509-926-3585	7/15/15

For District Use Only

Application #:	Invoice #:	Permit #:	Company/Facility #:

Antelope Valley Air Quality Management District

43301 Division Street, Suite 206, Lancaster, CA 93535-4649
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Application for Authority to Construct and Permit to Operate

Please type or print.

Please remit $498 ($175 for change of owner).

1. Permit to be Issued to (name of company to receive permit): Palmdale Energy, LLC	**1a. Federal Tax ID #:** 36-4810897
2. Mailing/Billing Address (for the above company name): 801 2nd Avenue, Suite 1150, Seattle, WA. 98104	
3. Facility or Business Name on License (for equipment location): Palmdale Energy, LLC	
4. Facility Address/Location of Equipment (if same as company, enter "Same"): 950 East Avenue M, Palmdale, CA. 93550	**Facility UTM or Lat/Long:**

5. Contact Name and Title:	**E-mail Address:**	**Phone and Fax #s:**
Thomas Johns	tjohns@summitpower.com	509-92603585

6. Application is hereby made for the Authority to Construct (ATC) and Permit to Operate (PTO) the following equipment:

Combined cycle Gas turbine/HRSG #1 (see AFC for detailed information)

7. Air Pollution Control Equipment, if any*:

SCR and CO Oxidation Catalyst

(*Note that most APCEs require a separate application.)

8. Application is for:

☒ New Construction ☐ Modification* ☐ Change of Owner*

***For modification or change of owner:**

Current permit #: ______

9. Type of Organization (check one):

☐ Individual Owner ☐ Partnership ☒ Corporation ☐ Utility ☐ Local Agency ☐ State Agency ☐ Federal Agency

10. Distances (feet and direction to closest):

Fenceline ______ Residence ______ Business ______ School ______

11. General Nature of Business:	**12. Principal Product:**	**13. SIC Code (if known):**
Electricity production	Electricity	4911

14. Facility Annual Throughput by Quarters (percent):

Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
25 %	25 %	25 %	25 %

15. Expected Facility Operating Hours:

Hrs/Day	Days/Wk	Wks/Yr	Total Hrs/Yr
24	7	52	8000

16. Do you claim Confidentiality of Data? (If yes, state nature of data in an attachment.) ☐ Yes ☒ No

Antelope Valley Air Quality Management District
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Application for Authority to Construct and Permit to Operate

17. Stack Emissions Information

Stack #	Stack Height[1]	Stack Diameter[2]	Exhaust Temp.[3]	Exhaust Flow Rate[4]	Exhaust Velocity[5]
1	see AFC	for detailed	information		
2					
3					

**List additional stacks on a separate sheet as needed.

Measurements Key:
1. Stack height is the distance in feet above ground level to discharge point.
2. Stack diameter is the diameter (or equivalent circular diameter) of discharge point (nearest tenth foot). If using cross-sectional area (A in square feet), equivalent diameter is D = (1.273A)^0.5
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4. Exhaust flow rate at discharge point in actual cubic feet per minute (ACFM).
5. Exhaust velocity in feet per second, design or measured.

18. Remarks
This section may include your basis for confidentiality, process description, modification description, and so forth. If you wish to specify process information as proprietary or confidential, use this space. Note that the kinds and rates of emissions cannot be held confidential and that emissions are subject to public disclosure. Attach additional sheets as needed.

see AFC Air Quality section and Appendices 5.2A through 5.2H

Signature of Responsible Official:		Official Title:
Thomas Johns		VP Dev
Typed or Printed Name of Responsible Official:	**Phone Number:**	**Date Signed:**
Thomas Johns	509-926-3585	7/15/15

For District Use Only

Application #:	Invoice #:	Permit #:	Company/Facility #:

APPENDIX 6-A
PARCEL SPLIT DOCUMENTATION

TING LOTS 1, 2 AND 4 TO THE SAID
OR ADJACENT TO THIS SUBDIVISION
E DEDICATION AS TO THE PART

ORATION ORGANIZED UNDER THE LAWS OF
FORNIA)

R

a J. Smith, Notary Public

Y EVIDENCE TO BE THE PERSON WHOSE
ND ACKNOWLEDGED TO ME THAT HE
AND THAT BY HIS SIGNATURE ON THE
IALF OF WHICH THE PERSON ACTED,

LAWS OF THE STATE OF CALIFORNIA
RRECT

S COUNTY

017

LDER OF RIGHT OF WAY FOR
ED IN PATENTS RECORDED IN
OF PATENTS HAVE BEEN
(a)(3)(A)(I–VIII) OF THE
T IT CANNOT RIPEN INTO A FEE
THE LOCAL AGENCY.

MUNICIPAL CORPORATION,
DECEMBER 2, 1964, AS
F OFFICIAL RECORDS; IN BOOK
3 OF DEEDS; AND FEBRUARY 19,
DS, HAVE BEEN OMITTED UNDER
OF THE SUBDIVISION MAP ACT,
O A FEE TITLE, AND SAID
NCY.

E COMPANY, A CORPORATION
OSES, ORIGINALLY RECORDED
AL RECORDS AND RECORDED
OF TORRENS OF OFFICIAL
NS OF SECTION 66436
INTEREST IS SUCH THAT IT
RES ARE NOT REQUIRED BY THE

APH COMPANY, A CORPORATION
OSES, RECORDED MAY 8, 1952
, OFFICIAL RECORDS, HAVE BEEN
(a)(3)(A)(I–VIII) OF THE
T IT CANNOT RIPEN INTO A FEE
THE LOCAL AGENCY.

CITY SURVEYORS STATEMENT

I HEREBY STATE THAT I HAVE EXAMINED THIS MAP, THAT IT
MAP AND ALL APPROVED ALTERATIONS THEREOF; THAT ALL
SUBDIVISION ORDINANCE OF THE CITY OF PALMDALE APPLICAB
TENTATIVE MAP HAVE BEEN COMPLIED WITH; AND THAT I AM
CORRECT.

8/26/14

DATE

MICHAEL J. MISCHEL, LS 7758
CITY SURVEYOR, CITY OF PALMDALE
REGISTRATION EXPIRES: 12/31/15

CITY CLERK'S STATEMENT

I, REBECCA J. SMITH, CITY CLERK OF THE CITY OF PALMDALE,
PRESENTED FOR APPROVAL TO THE PALMDALE COUNCIL AT A
5TH , 2014, AND THAT THEREUPON SAID COUNCIL DID, BY AN
SAID MAP, AND ACCEPTED ON BEHALF OF THE PUBLIC, THE C
AND OTHER PUBLIC WAYS ALONG AVENUE M AS SHOWN ON T
OFFER OF DEDICATION OF DRAINAGE BASINS SO DEDICATED O

SAID COUNCIL DID ALSO ACCEPT THE ABANDONMENT OF THE
PURPOSES FOR THE STREETS: GREEN TREE PARKWAY WEST, C
PATH DRIVE, ACE WAY, SHOT MAKERS WAY AND CHALLENGER
RECORDED IN BOOK 283 PAGES 31 THRU 39 OF PARCEL MAP
WIDE EASEMENT RECORDED IN BOOK 7388, PAGE 75, OFFICIAL

9/8/2014

DATE

REBECCA J. SMITH
CITY CLERK – CITY OF PALMDALE

SPECIAL ASSESSMENTS STATEME

I HEREBY CERTIFY THAT ALL SPECIAL ASSESSMENTS LEVIED U
PALMDALE TO WHICH THE LAND INCLUDED IN THE WITHIN SUB
AND WHICH MAY BE PAID IN FULL, HAVE BEEN PAID IN FULL.

9/8/2014

DATE

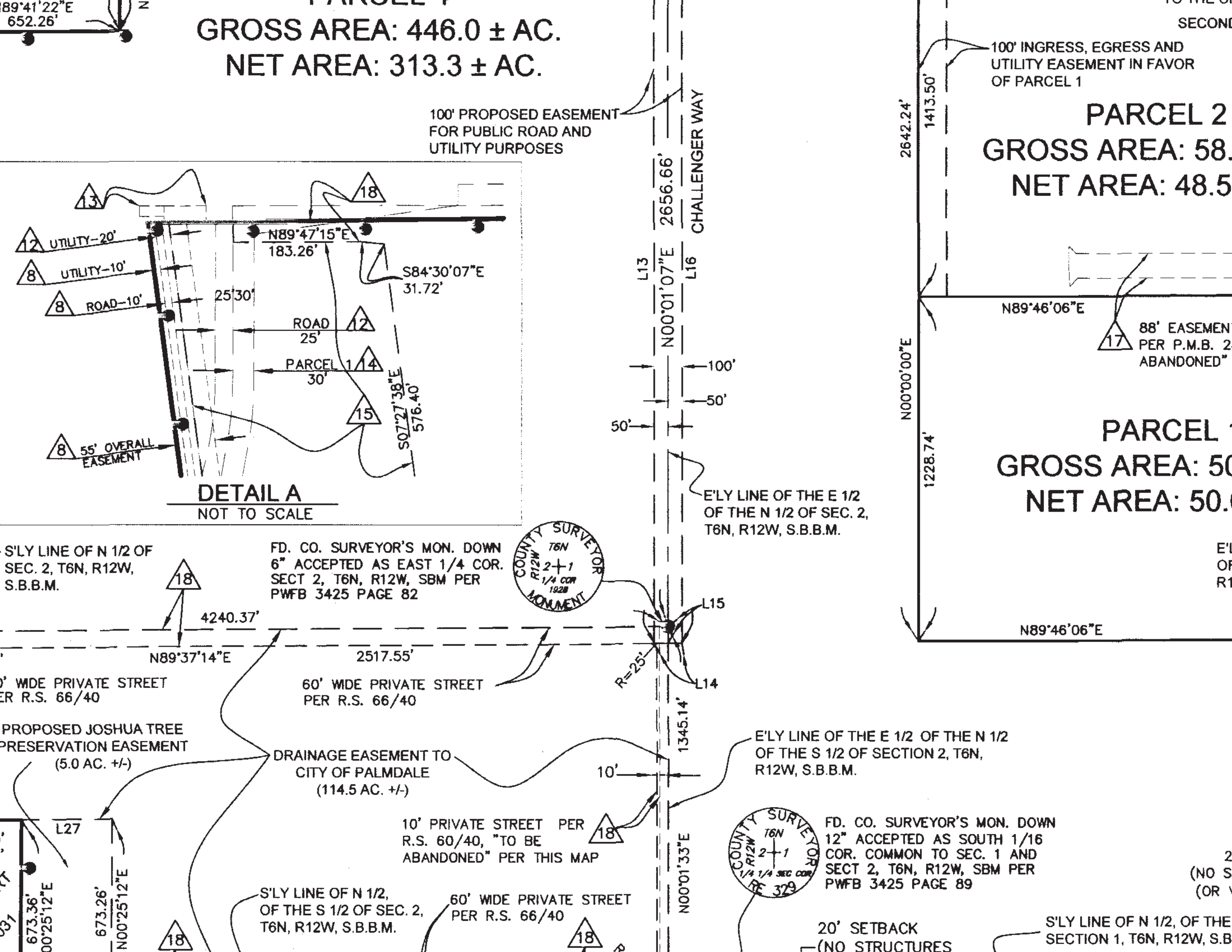
REBECCA J. SMITH
CITY CLERK – CITY OF PALMDALE

ABANDONMENT NOTE

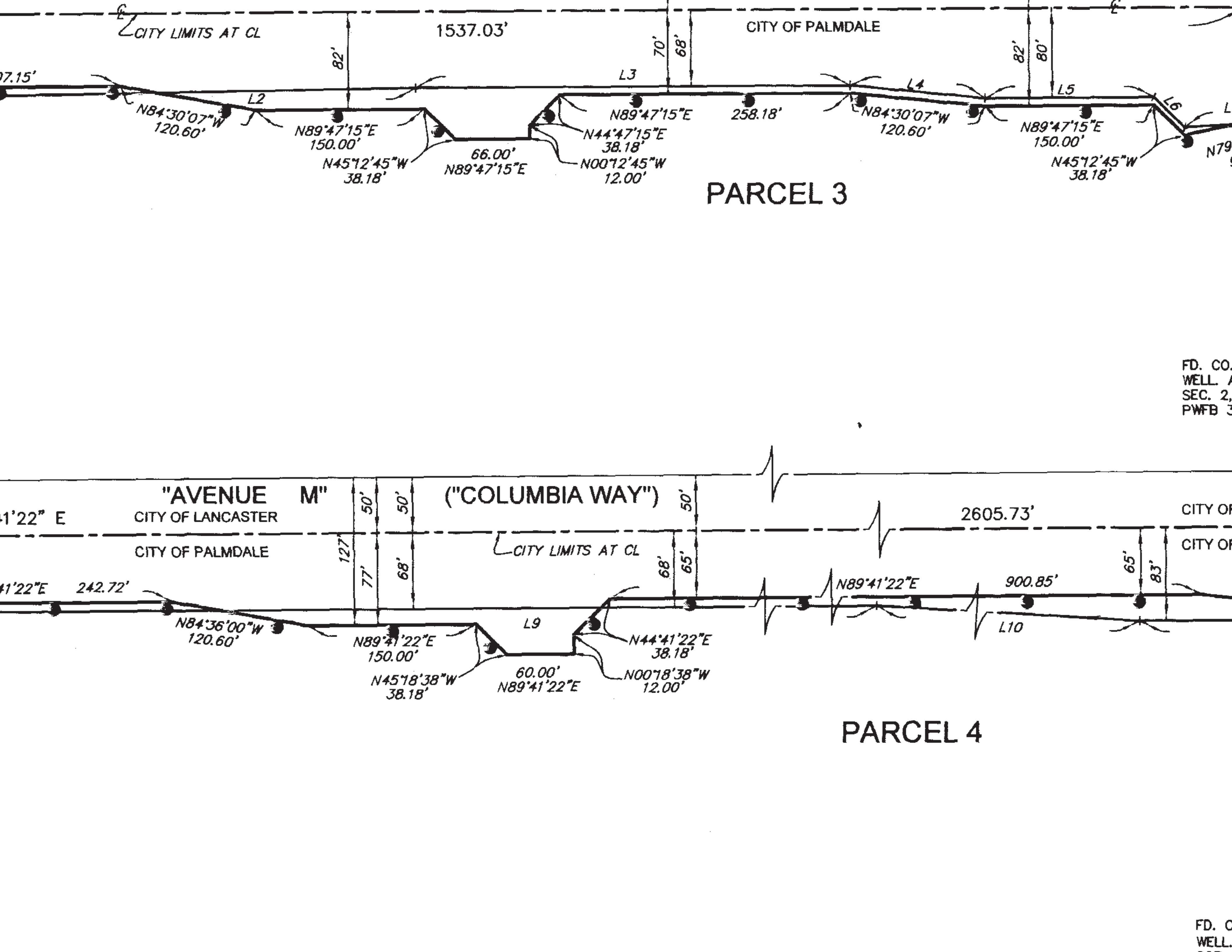
PURSUANT TO SECTION 66499.20 1/2 OF THE SUBDIVISION MA
ABANDONMENT OF EASEMENTS FOR PUBLIC ROAD AND HIGHWA
DEDICATION PER PARCEL MAP 24191 RECORDED IN THE COUNT
AND A 20' WIDE EASEMENT FILED IN BOOK 7388 PAGE 74 OF
ON THIS MAP.

AN EASEMENT TO THE CITY OF PALMDALE FOR FLOOD CONTRO
DEDICATED ON PARCEL MAP NO. 24191 P.M.B. 283–31–39, R
A PORTION OF SAID EASEMENT IS "TO BE ABANDONED" PER T

AN EASEMENT TO THE CITY OF PALMDALE FOR INGRESS AND
INCIDENTAL PURPOSES AS DEDICATED ON PARCEL MAP NO. 24
ANGELES COUNTY. "TO BE ABANDONED" PER THIS MAP.



GROSS AREA: 446.0 ± AC.
NET AREA: 313.3 ± AC.
N89°41'22"E
652.26'
100' PROPOSED EASEMENT FOR PUBLIC ROAD AND UTILITY PURPOSES
CHALLENGER WAY
2656.66'
N00°01'07"E
L13
L16
100'
50'
50'
UTILITY-20'
UTILITY-10'
ROAD-10'
55' OVERALL EASEMENT
N89°47'15"E
183.26'
S84°30'07"E
31.72'
25'
30'
ROAD
25'
PARCEL 1
30'
S07°27'38"E
576.40'
DETAIL A
NOT TO SCALE
E'LY LINE OF THE E 1/2 OF THE N 1/2 OF SEC. 2, T6N, R12W, S.B.B.M.
S'LY LINE OF N 1/2 OF SEC. 2, T6N, R12W, S.B.B.M.
FD. CO. SURVEYOR'S MON. DOWN 6" ACCEPTED AS EAST 1/4 COR. SECT 2, T6N, R12W, SBM PER PWFB 3425 PAGE 82
COUNTY SURVEYOR T6N R12W 2 1 1/4 COR 1928 MONUMENT
L15
L14
R=25'
4240.37'
N89°37'14"E
2517.55'
60' WIDE PRIVATE STREET PER R.S. 66/40
60' WIDE PRIVATE STREET PER R.S. 66/40
PROPOSED JOSHUA TREE PRESERVATION EASEMENT (5.0 AC. +/-)
DRAINAGE EASEMENT TO CITY OF PALMDALE (114.5 AC. +/-)
1345.14'
10'
E'LY LINE OF THE E 1/2 OF THE N 1/2 OF THE S 1/2 OF SECTION 2, T6N, R12W, S.B.B.M.
10' PRIVATE STREET PER R.S. 60/40, "TO BE ABANDONED" PER THIS MAP
N00°01'33"E
L27
673.36'
N00°25'12"E
673.26'
N00°25'12"E
S'LY LINE OF N 1/2, OF THE S 1/2 OF SEC. 2, T6N, R12W, S.B.B.M.
60' WIDE PRIVATE STREET PER R.S. 66/40
COUNTY SURVEYOR T6N R12W 2 1 1/4 1/4 SEC COR RE 329
FD. CO. SURVEYOR'S MON. DOWN 12" ACCEPTED AS SOUTH 1/16 COR. COMMON TO SEC. 1 AND SECT 2, T6N, R12W, SBM PER PWFB 3425 PAGE 89
20' SETBACK
S'LY LINE OF N 1/2, OF THE SECTION 1, T6N, R12W, S.B
100' INGRESS, EGRESS AND UTILITY EASEMENT IN FAVOR OF PARCEL 1
1413.50'
2642.24'
PARCEL 2
N89°46'06"E
88' EASEMEN PER P.M.B. ABANDONED"
N00°00'00"E
1228.74'
PARCEL
N89°46'06"E



CITY LIMITS AT CL
1537.03'
CITY OF PALMDALE
82'
70'
68'
82'
80'
L2
L3
L4
L5
L6
N84°30'07"W 120.60'
N89°47'15"E 150.00'
N45°12'45"W 38.18'
66.00' N89°47'15"E
N44°47'15"E 38.18'
N00°12'45"W 12.00'
N89°47'15"E
258.18'
N84°30'07"W 120.60'
N89°47'15"E 150.00'
N45°12'45"W 38.18'
PARCEL 3
"AVENUE M"
("COLUMBIA WAY")
CITY OF LANCASTER
CITY OF PALMDALE
CITY LIMITS AT CL
2605.73'
50'
50'
50'
127'
77'
68'
68'
65'
65'
83'
242.72'
N84°36'00"W 120.60'
N89°41'22"E 150.00'
N45°18'38"W 38.18'
L9
60.00' N89°41'22"E
N44°41'22"E 38.18'
N00°18'38"W 12.00'
N89°41'22"E
900.85'
L10
PARCEL 4

APPENDIX 6-B
CONSTRUCTION WORKER ESTIMATES

ce by

	M 1	M 2	M 3	M 4	M 5	M 6	M 7	M 8	M 9	M 10	M 11	M 12	M 13	M 14	M 15	M 16	M 17	M 18	M 19	M 20	M 21	M 22	M 23	M 24	M 25	M 26	M 27
ent																											
Subtotal	*129*	*148*	*167*	*185*	*204*	*252*	*263*	*267*	*269*	*272*	*272*	*285*	*272*	*259*	*227*	*210*	*184*	*181*	*167*	*166*	*152*	*126*	*118*	*106*	*105*	*104*	*99*
	0	0	40	40	40	60	80	100	140	180	220	340	360	300	180	80	50	50	0	0	0	0	0	0	0	0	0
	129	148	207	225	244	312	343	367	409	452	492	625	632	559	407	290	234	231	167	166	152	126	118	106	105	104	99

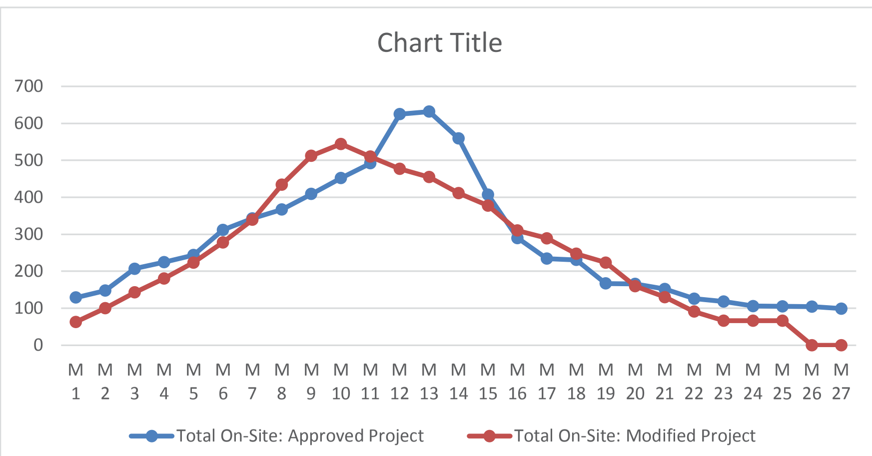
Monthly Ave - Approved F
Monthly Max- Approved F

Monthly Average - Modifi
Monthly Maximum - Mod

PEP Construction Workforce by Skill

	M 1	M 2	M 3	M 4	M 5	M 6	M 7	M 8	M 9	M 10	M 11	M 12	M 13	M 14	M 15	M 16	M 17	M 18	M 19	M 20	M 21	M 22	M 23	M 24	M 25	M 26	M 27
	63	*100*	*143*	*180*	*224*	*278*	*339*	*434*	*513*	*544*	*510*	*477*	*455*	*411*	*377*	*310*	*289*	*247*	*224*	*160*	*130*	*91*	*66*	*66*	*66*	*0*	*0*

M 1	M 2	M 3	M 4	M 5	M 6	M 7	M 8	M 9	M 10	M 11	M 12	M 13	M 14	M 15	M 16	M 17	M 18	M 19	M 20	M 21	M 22	M 23	M 24	M 25	M 26	M 27
129	148	207	225	244	312	343	367	409	452	492	625	632	559	407	290	234	231	167	166	152	126	118	106	105	104	99
63	*100*	*143*	*180*	*224*	*278*	*339*	*434*	*513*	*544*	*510*	*477*	*455*	*411*	*377*	*310*	*289*	*247*	*224*	*160*	*130*	*91*	*66*	*66*	*66*	*0*	*0*



APPENDIX 6-C
UPDATED TRAFFIC COUNTS

City of Palmdale
Vehicle Volume Counts

Site Code: 000000004265
Station ID: 4265
Avenue M
6th Street West
Date Start: 03-Mar-14

Weather: Clear and Dry
Counted By: JF & VH
Board #: 4265
Location: AVE M E/O 6TH ST W

Start	03-Mar-14		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	*	*	77	74	81	57	82	65	73	60	127	85	99	68	90	68
01:00	*	*	54	59	51	71	55	66	57	54	98	56	73	39	65	58
02:00	*	*	31	120	45	119	46	132	32	122	72	43	55	45	47	97
03:00	*	*	18	41	30	53	34	40	39	34	38	30	54	28	36	38
04:00	*	*	83	79	97	70	70	67	78	77	51	36	56	32	72	60
05:00	*	*	390	223	384	196	376	211	232	185	81	51	57	52	253	153
06:00	*	*	474	294	492	310	475	316	403	249	87	96	67	62	333	221
07:00	*	*	577	462	625	435	582	447	529	391	147	230	150	126	435	348
08:00	*	*	**830**	**710**	**897**	694	**880**	686	**877**	**676**	321	326	158	148	**660**	540
09:00	*	*	658	607	544	664	632	625	595	580	318	311	263	173	502	493
10:00	*	*	404	665	431	564	363	564	406	555	329	345	272	237	368	488
11:00	*	*	434	668	471	**727**	430	**734**	457	622	**383**	**375**	**273**	**276**	408	**567**
12:00 PM	*	*	459	711	506	855	443	758	506	779	349	406	276	**317**	423	638
01:00	*	*	590	598	620	585	649	558	655	591	**393**	**419**	274	272	530	504
02:00	*	*	635	606	**639**	622	**715**	650	**695**	679	341	412	279	260	**551**	538
03:00	*	*	**680**	762	624	798	651	723	622	795	373	372	**330**	262	547	619
04:00	**625**	1105	587	984	585	1145	627	1096	599	783	361	359	281	256	524	818
05:00	550	**1138**	582	**1178**	579	**1194**	624	**1183**	553	**849**	378	373	289	189	508	**872**
06:00	541	681	552	718	595	726	611	722	500	539	356	287	286	150	492	546
07:00	392	414	441	473	449	420	421	429	439	407	276	200	243	149	380	356
08:00	251	253	323	281	277	263	347	273	312	212	270	163	242	141	289	227
09:00	270	187	266	184	270	195	270	279	276	173	210	121	219	96	254	176
10:00	242	100	213	129	272	142	233	140	264	158	231	96	141	64	228	118
11:00	135	82	138	96	131	100	133	113	167	137	162	110	91	45	137	98
Lane	3006	3960	9496	10722	9695	11005	9749	10877	9366	9707	5752	5302	4528	3487	8132	8641
Day	6966		20218		20700		20626		19073		11054		8015		16773	
AM Peak			08:00	08:00	08:00	11:00	08:00	11:00	08:00	08:00	11:00	11:00	11:00	11:00	08:00	11:00
Vol.			830	710	897	727	880	734	877	676	383	375	273	276	660	567
PM Peak	16:00	17:00	15:00	17:00	14:00	17:00	14:00	17:00	14:00	17:00	13:00	13:00	15:00	12:00	14:00	17:00
Vol.	625	1138	680	1178	639	1194	715	1183	695	849	393	419	330	317	551	872

City of Palmdale
Vehicle Volume Counts

Site Code: 000000004265
Station ID: 4265
Avenue M
6th Street West
Date Start: 03-Mar-14

Weather: Clear and Dry
Counted By: JF & VH
Board #: 4265
Location: AVE M E/O 6TH ST W

Start	10-Mar-14		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	41	25	*	*	*	*	*	*	*	*	*	*	*	*	41	25
01:00	34	23	*	*	*	*	*	*	*	*	*	*	*	*	34	23
02:00	25	23	*	*	*	*	*	*	*	*	*	*	*	*	25	23
03:00	86	52	*	*	*	*	*	*	*	*	*	*	*	*	86	52
04:00	386	133	*	*	*	*	*	*	*	*	*	*	*	*	386	133
05:00	429	181	*	*	*	*	*	*	*	*	*	*	*	*	429	181
06:00	533	255	*	*	*	*	*	*	*	*	*	*	*	*	533	255
07:00	824	409	*	*	*	*	*	*	*	*	*	*	*	*	**824**	**409**
08:00	639	331	*	*	*	*	*	*	*	*	*	*	*	*	639	331
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12:00 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Lane	2997	1432	0	0	0	0	0	0	0	0	0	0	0	0	2997	1432
Day	4429		0		0		0		0		0		0		4429	
AM Peak	07:00	07:00													07:00	07:00
Vol.	824	409													824	409
PM Peak																
Vol.																
Comb. Total	11395		20218		20700		20626		19073		11054		8015		21202	
ADT	Not Calculated															

City of Palmdale
Vehicle Volume Counts

Site Code: 000000004261
Station ID: 4261
Avenue M
Challenger Way
Date Start: 15-Mar-10

Weather: Clear and Dry
Counted By: JF and VH
Board #: 4261
Location: AVE M W/O CHALLENGER WY

Start	15-Mar-10		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB
12:00																
AM	*	*	157	71	137	67	157	74	146	74	52	76	59	86	118	75
01:00	*	*	33	32	36	28	38	45	42	39	44	63	37	50	38	43
02:00	*	*	63	63	69	58	55	63	58	43	42	51	29	44	53	54
03:00	*	*	155	352	156	324	162	348	163	181	53	115	29	79	120	233
04:00	*	*	350	422	351	410	350	400	295	190	114	80	72	51	255	259
05:00	*	*	497	536	496	565	532	559	490	355	222	111	132	75	395	367
06:00	*	*	**845**	**577**	**836**	**593**	**887**	**576**	753	351	341	192	150	108	**635**	**400**
07:00	*	*	786	399	732	327	760	409	**805**	334	453	195	245	193	630	310
08:00	*	*	578	297	576	277	602	286	566	293	457	267	330	208	518	271
09:00	*	*	501	286	457	266	498	314	528	337	470	315	411	187	478	284
10:00	*	*	560	386	527	371	603	392	540	389	465	324	363	**232**	510	349
11:00	*	*	490	491	557	438	515	450	535	**394**	**485**	**404**	**463**	210	508	398
12:00																
PM	*	*	576	447	564	423	516	427	605	456	**474**	433	**412**	245	524	405
01:00	*	*	588	554	582	500	631	537	579	488	460	407	383	229	537	452
02:00	**1007**	506	**1011**	575	**993**	543	**967**	581	**687**	539	471	416	391	288	**790**	493
03:00	923	654	946	601	891	604	898	653	646	566	404	413	367	**325**	725	545
04:00	729	**675**	799	**668**	706	**698**	790	**731**	541	**672**	375	**447**	324	317	609	**601**
05:00	518	512	535	593	548	631	471	600	434	545	321	374	288	320	445	511
06:00	370	435	362	485	375	439	379	505	415	516	282	348	337	312	360	434
07:00	240	386	268	414	287	429	315	466	271	424	230	316	236	291	264	389
08:00	176	318	194	363	202	338	224	408	181	413	214	330	177	278	195	350
09:00	117	228	106	238	144	315	144	237	188	314	151	264	115	186	138	255
10:00	86	145	78	132	86	144	65	142	117	199	139	205	80	135	93	157
11:00	57	81	75	83	69	84	74	82	68	123	67	131	50	79	66	95
Lane	4223	3940	10553	9065	10377	8872	10633	9285	9653	8235	6786	6277	5480	4528	9004	7730
Day	8163		19618		19249		19918		17888		13063		10008		16734	
AM Peak			06:00	06:00	06:00	06:00	06:00	06:00	07:00	11:00	11:00	11:00	11:00	10:00	06:00	06:00
Vol.			845	577	836	593	887	576	805	394	485	404	463	232	635	400
PM Peak	14:00	16:00	14:00	16:00	14:00	16:00	14:00	16:00	14:00	16:00	12:00	16:00	12:00	15:00	14:00	16:00
Vol.	1007	675	1011	668	993	698	967	731	687	672	474	447	412	325	790	601

City of Palmdale
Vehicle Volume Counts

Site Code: 000000004261
Station ID: 4261
Avenue M
Challenger Way
Date Start: 15-Mar-10

Weather: Clear and Dry
Counted By: JF and VH
Board #: 4261
Location: AVE M W/O CHALLENGER WY

Start Time	22-Mar-10 WB	EB	Tue WB	EB	Wed WB	EB	Thu WB	EB	Fri WB	EB	Sat WB	EB	Sun WB	EB	Week Average WB	EB
12:00 AM	51	46	146	40	149	72	*	*	*	*	*	*	*	*	115	53
01:00	27	36	29	41	39	36	*	*	*	*	*	*	*	*	32	38
02:00	64	66	50	54	56	66	*	*	*	*	*	*	*	*	57	62
03:00	156	371	162	362	175	361	*	*	*	*	*	*	*	*	164	365
04:00	358	401	359	452	352	413	*	*	*	*	*	*	*	*	356	422
05:00	483	**477**	481	**489**	499	**473**	*	*	*	*	*	*	*	*	488	**480**
06:00	696	445	**774**	427	**820**	384	*	*	*	*	*	*	*	*	**763**	419
07:00	**728**	284	704	255	741	224	*	*	*	*	*	*	*	*	724	254
08:00	532	219	543	219	546	202	*	*	*	*	*	*	*	*	540	213
09:00	506	213	509	206	491	185	*	*	*	*	*	*	*	*	502	201
10:00	529	238	590	222	520	175	*	*	*	*	*	*	*	*	546	212
11:00	461	271	452	263	519	249	*	*	*	*	*	*	*	*	477	261
12:00 PM	551	290	542	230	**566**	**233**	*	*	*	*	*	*	*	*	553	251
01:00	549	314	578	299	*	*	*	*	*	*	*	*	*	*	564	306
02:00	**953**	366	**911**	308	*	*	*	*	*	*	*	*	*	*	**932**	337
03:00	828	463	801	328	*	*	*	*	*	*	*	*	*	*	814	396
04:00	701	**502**	769	**408**	*	*	*	*	*	*	*	*	*	*	735	**455**
05:00	469	454	516	364	*	*	*	*	*	*	*	*	*	*	492	409
06:00	322	417	333	395	*	*	*	*	*	*	*	*	*	*	328	406
07:00	217	317	266	330	*	*	*	*	*	*	*	*	*	*	242	324
08:00	156	272	205	308	*	*	*	*	*	*	*	*	*	*	180	290
09:00	121	204	127	212	*	*	*	*	*	*	*	*	*	*	124	208
10:00	76	126	83	126	*	*	*	*	*	*	*	*	*	*	80	126
11:00	61	82	82	85	*	*	*	*	*	*	*	*	*	*	72	84
Lane	9595	6874	10012	6423	5473	3073	0	0	0	0	0	0	0	0	9880	6572
Day	16469		16435		8546		0		0		0		0		16452	
AM Peak	07:00	05:00	06:00	05:00	06:00	05:00									06:00	05:00
Vol.	728	477	774	489	820	473									763	480
PM Peak	14:00	16:00	14:00	16:00	12:00	12:00									14:00	16:00
Vol.	953	502	911	408	566	233									932	455
Comb. Total	24632		36053		27795		19918		17888		13063		10008		33186	

ADT Not Calculated

City of Palmdale
Vehicle Volume Counts

Site Code: 000000005557
Station ID: 5557
Challenger Way
Avenue M
Date Start: 15-Mar-10

Weather: Clear and Dry
Counted By: JF and VH
Board #: 5557
Location: CHALLENGER WY N/O AVE M

Start	15-Mar-10		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
12:00 AM	*	*	19	34	13	32	15	25	19	35	27	32	26	42	20	33
01:00	*	*	27	24	22	18	22	14	26	10	27	29	23	19	24	19
02:00	*	*	11	8	9	10	15	4	13	7	20	18	15	18	14	11
03:00	*	*	29	9	39	5	37	12	31	12	18	12	16	15	28	11
04:00	*	*	92	17	84	17	89	20	74	23	28	14	12	17	63	18
05:00	*	*	146	56	128	62	141	56	112	60	41	29	30	18	100	47
06:00	*	*	146	113	151	124	157	126	142	128	86	53	51	26	122	95
07:00	*	*	**228**	**220**	**203**	**235**	**205**	**220**	214	**213**	126	81	87	37	177	**168**
08:00	*	*	202	141	171	124	199	124	196	129	185	91	114	70	178	113
09:00	*	*	170	144	141	125	193	142	186	141	175	118	165	81	172	125
10:00	*	*	157	142	150	140	163	181	175	150	199	**166**	**168**	**101**	169	147
11:00	*	*	169	162	173	148	193	169	**218**	173	**208**	149	154	99	**186**	150
12:00 PM	*	*	154	164	177	162	161	169	189	161	182	153	**199**	111	177	153
01:00	*	*	186	175	175	154	185	168	206	204	**199**	179	166	151	186	172
02:00	*	*	165	263	157	255	164	233	174	252	180	180	153	153	166	223
03:00	196	308	190	289	210	307	183	278	199	267	152	**210**	140	164	181	260
04:00	**204**	**332**	**216**	**308**	201	**319**	**217**	**341**	**259**	275	165	188	146	**168**	**201**	**276**
05:00	186	254	185	261	**218**	285	200	255	197	**278**	154	188	135	149	182	239
06:00	148	189	184	247	153	217	177	231	180	246	139	158	135	162	159	207
07:00	115	165	112	173	115	161	128	170	155	209	119	140	119	134	123	165
08:00	85	151	89	137	109	155	106	179	102	155	104	117	95	135	99	147
09:00	71	88	105	105	95	118	97	131	106	153	85	123	83	92	92	116
10:00	46	66	41	56	50	84	57	82	86	104	56	92	47	63	55	78
11:00	17	41	29	37	35	45	19	42	35	69	47	78	32	45	31	51
Lane	1068	1594	3052	3285	2979	3302	3123	3372	3294	3454	2722	2598	2311	2070	2905	3024
Day	2662		6337		6281		6495		6748		5320		4381		5929	
AM Peak			07:00	07:00	07:00	07:00	07:00	07:00	11:00	07:00	11:00	10:00	10:00	10:00	11:00	07:00
Vol.			228	220	203	235	205	220	218	213	208	166	168	101	186	168
PM Peak	16:00	16:00	16:00	16:00	17:00	16:00	16:00	16:00	16:00	17:00	13:00	15:00	12:00	16:00	16:00	16:00
Vol.	204	332	216	308	218	319	217	341	259	278	199	210	199	168	201	276

City of Palmdale
Vehicle Volume Counts

Site Code: 000000005557
Station ID: 5557
Challenger Way
Avenue M
Date Start: 15-Mar-10

Weather: Clear and Dry
Counted By: JF and VH
Board #: 5557
Location: CHALLENGER WY N/O AVE M

Start	22-Mar-10		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
12:00 AM	19	22	*	*	*	*	*	*	*	*	*	*	*	*	19	22
01:00	4	15	*	*	*	*	*	*	*	*	*	*	*	*	4	15
02:00	14	6	*	*	*	*	*	*	*	*	*	*	*	*	14	6
03:00	41	10	*	*	*	*	*	*	*	*	*	*	*	*	41	10
04:00	92	14	*	*	*	*	*	*	*	*	*	*	*	*	92	14
05:00	126	40	*	*	*	*	*	*	*	*	*	*	*	*	126	40
06:00	145	105	*	*	*	*	*	*	*	*	*	*	*	*	145	105
07:00	**190**	**195**	*	*	*	*	*	*	*	*	*	*	*	*	**190**	**195**
08:00	172	129	*	*	*	*	*	*	*	*	*	*	*	*	172	129
09:00	155	133	*	*	*	*	*	*	*	*	*	*	*	*	155	133
10:00	152	154	*	*	*	*	*	*	*	*	*	*	*	*	152	154
11:00	167	165	*	*	*	*	*	*	*	*	*	*	*	*	167	165
12:00 PM	**205**	162	*	*	*	*	*	*	*	*	*	*	*	*	**205**	162
01:00	186	166	*	*	*	*	*	*	*	*	*	*	*	*	186	166
02:00	185	210	*	*	*	*	*	*	*	*	*	*	*	*	185	210
03:00	165	298	*	*	*	*	*	*	*	*	*	*	*	*	165	298
04:00	189	**349**	*	*	*	*	*	*	*	*	*	*	*	*	189	**349**
05:00	167	267	*	*	*	*	*	*	*	*	*	*	*	*	167	267
06:00	124	209	*	*	*	*	*	*	*	*	*	*	*	*	124	209
07:00	117	142	*	*	*	*	*	*	*	*	*	*	*	*	117	142
08:00	83	96	*	*	*	*	*	*	*	*	*	*	*	*	83	96
09:00	71	101	*	*	*	*	*	*	*	*	*	*	*	*	71	101
10:00	44	61	*	*	*	*	*	*	*	*	*	*	*	*	44	61
11:00	26	38	*	*	*	*	*	*	*	*	*	*	*	*	26	38
Lane	2839	3087	0	0	0	0	0	0	0	0	0	0	0	0	2839	3087
Day	5926		0		0		0		0		0		0		5926	
AM Peak	07:00	07:00													07:00	07:00
Vol.	190	195													190	195
PM Peak	12:00	16:00													12:00	16:00
Vol.	205	349													205	349

Comb. Total	8588	6337	6281	6495	6748	5320	4381	11855
ADT	Not Calculated							

City of Palmdale
Vehicle Volume Counts

Weather: Clear and Dry
Counted By: JF & VH
Board #: 17928
Location: SIERRA HWY N/O AVE O

Site Code: 17928
Station ID: 17928
Sierra Highway
Avenue O
Date Start: 20-May-13

Start	20-May-13		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	*	*	102	69	108	85	0	199	*	*	*	*	*	*	70	118
01:00	*	*	84	81	71	64	0	139	*	*	*	*	*	*	52	95
02:00	*	*	39	42	49	43	0	101	*	*	*	*	*	*	29	62
03:00	*	*	56	52	99	64	0	125	*	*	*	*	*	*	52	80
04:00	*	*	127	137	152	138	0	261	*	*	*	*	*	*	93	179
05:00	*	*	262	436	284	447	0	644	*	*	*	*	*	*	182	509
06:00	*	*	490	579	454	579	0	990	*	*	*	*	*	*	315	716
07:00	*	*	878	685	**797**	755	0	1515	*	*	*	*	*	*	**558**	985
08:00	*	*	**1000**	**772**	0	**1781**	0	**1804**	*	*	*	*	*	*	333	**1452**
09:00	*	*	823	698	0	1465	*	*	*	*	*	*	*	*	412	1082
10:00	*	*	730	712	0	1417	*	*	*	*	*	*	*	*	365	1064
11:00	*	*	687	756	0	1502	*	*	*	*	*	*	*	*	344	1129
12:00 PM	*	*	733	862	**1**	1639	*	*	*	*	*	*	*	*	367	1250
01:00	*	*	837	772	0	1646	*	*	*	*	*	*	*	*	418	1209
02:00	*	*	913	858	0	1855	*	*	*	*	*	*	*	*	456	1356
03:00	*	*	1106	**1114**	0	2147	*	*	*	*	*	*	*	*	553	**1630**
04:00	**1214**	964	**1179**	1057	0	**2231**	*	*	*	*	*	*	*	*	**798**	1417
05:00	1084	**1026**	1071	1059	0	2181	*	*	*	*	*	*	*	*	718	1422
06:00	779	690	788	717	0	1634	*	*	*	*	*	*	*	*	522	1014
07:00	515	527	607	551	0	1159	*	*	*	*	*	*	*	*	374	746
08:00	406	422	461	478	0	840	*	*	*	*	*	*	*	*	289	580
09:00	309	320	347	360	0	814	*	*	*	*	*	*	*	*	219	498
10:00	255	243	263	293	0	531	*	*	*	*	*	*	*	*	173	356
11:00	176	157	159	155	0	326	*	*	*	*	*	*	*	*	112	213
Lane	4738	4349	13742	13295	2015	25343	0	5778	0	0	0	0	0	0	7804	19162
Day	9087		27037		27358		5778		0		0		0		26966	
AM Peak			08:00	08:00	07:00	08:00		08:00							07:00	08:00
Vol.			1000	772	797	1781		1804							558	1452
PM Peak	16:00	17:00	16:00	15:00	12:00	16:00									16:00	15:00
Vol.	1214	1026	1179	1114	1	2231									798	1630
Comb. Total	9087		27037		27358		5778		0		0		0		26966	

ADT Not Calculated

City of Palmdale
Vehicle Volume Counts

Site Code: 17926
Station ID: 17926
Sierra Highway
Avenue M
Date Start: 20-May-13

Weather: Clear and Dry
Counted By: JF & VH
Board #: 17926
Location: SIERRA HWY S/O AVE M

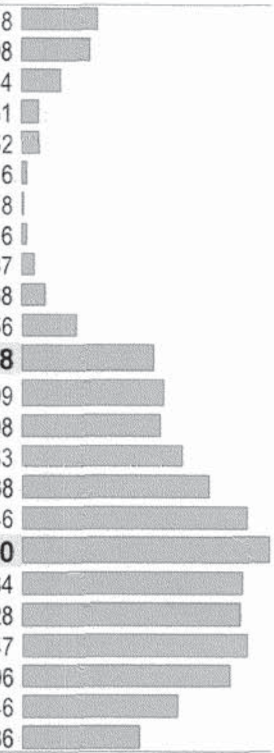
Start Time	20-May-13 NB	20-May-13 SB	Tue NB	Tue SB	Wed NB	Wed SB	Thu NB	Thu SB	Fri NB	Fri SB	Sat NB	Sat SB	Sun NB	Sun SB	Week Average NB	Week Average SB
12:00 AM	*	*	104	80	103	87	92	90	*	*	*	*	*	*	100	86
01:00	*	*	67	80	56	62	69	64	*	*	*	*	*	*	64	69
02:00	*	*	38	39	47	47	52	49	*	*	*	*	*	*	46	45
03:00	*	*	63	52	106	57	72	54	*	*	*	*	*	*	80	54
04:00	*	*	164	148	189	152	160	134	*	*	*	*	*	*	171	145
05:00	*	*	323	359	337	369	295	342	*	*	*	*	*	*	318	357
06:00	*	*	549	454	522	445	487	424	*	*	*	*	*	*	519	441
07:00	*	*	895	650	842	679	804	656	*	*	*	*	*	*	847	662
08:00	*	*	**912**	757	**940**	732	**883**	**732**	*	*	*	*	*	*	**912**	740
09:00	*	*	726	668	686	702	*	*	*	*	*	*	*	*	706	685
10:00	*	*	689	723	643	709	*	*	*	*	*	*	*	*	666	716
11:00	*	*	656	**765**	569	**774**	*	*	*	*	*	*	*	*	612	**770**
12:00 PM	*	*	707	818	616	833	*	*	*	*	*	*	*	*	662	826
01:00	*	*	753	763	578	859	*	*	*	*	*	*	*	*	666	811
02:00	*	*	817	854	664	903	*	*	*	*	*	*	*	*	740	878
03:00	*	*	914	**1102**	736	**1093**	*	*	*	*	*	*	*	*	825	**1098**
04:00	**1033**	1031	**963**	1079	**745**	1092	*	*	*	*	*	*	*	*	**914**	1067
05:00	953	**1064**	877	1047	732	1038	*	*	*	*	*	*	*	*	854	1050
06:00	658	681	664	701	643	755	*	*	*	*	*	*	*	*	655	712
07:00	491	480	543	518	504	502	*	*	*	*	*	*	*	*	513	500
08:00	372	409	416	471	393	406	*	*	*	*	*	*	*	*	394	429
09:00	303	305	335	323	326	406	*	*	*	*	*	*	*	*	321	345
10:00	235	233	241	264	230	239	*	*	*	*	*	*	*	*	235	245
11:00	174	135	146	131	159	143	*	*	*	*	*	*	*	*	160	136
Lane	4219	4338	12562	12846	11366	13084	2914	2545	0	0	0	0	0	0	11980	12867
Day	8557		25408		24450		5459		0		0		0		24847	
AM Peak			08:00	11:00	08:00	11:00	08:00	08:00							08:00	11:00
Vol.			912	765	940	774	883	732							912	770
PM Peak	16:00	17:00	16:00	15:00	16:00	15:00									16:00	15:00
Vol.	1033	1064	963	1102	745	1093									914	1098
Comb. Total	8557		25408		24450		5459		0		0		0		24847	
ADT	Not Calculated															

City of Palmdale
Vehicle Volume Counts

Weather: Clear and Dry
Counted By: JF and VH
Board #: 14055
Location: NB 10TH ST W S/O AVE M

Site Code: 14055
Station ID: 14055
10th Street West
Avenue M
Date Start: 06-Nov-12

Start Time	Mon 05-Nov-12	Tue 06-Nov-12	Wed 07-Nov-12	Thu 08-Nov-12	Fri 09-Nov-12	Average Day	Sat 10-Nov-12	Sun 11-Nov-12	Week Average
12:00 AM	*	*	227	209	*	218	*	*	218
01:00	*	*	189	206	*	198	*	*	198
02:00	*	*	117	111	*	114	*	*	114
03:00	*	*	54	48	*	51	*	*	51
04:00	*	*	58	46	*	52	*	*	52
05:00	*	*	16	17	*	16	*	*	16
06:00	*	*	11	6	*	8	*	*	8
07:00	*	*	15	17	*	16	*	*	16
08:00	*	*	32	42	*	37	*	*	37
09:00	*	*	75	62	*	68	*	*	68
10:00	*	*	157	154	*	156	*	*	156
11:00	*	*	**393**	**363**	*	**378**	*	*	**378**
12:00 PM	*	*	413	**405**	*	409	*	*	409
01:00	*	*	467	330	*	398	*	*	398
02:00	*	*	463	*	*	463	*	*	463
03:00	*	584	492	*	*	538	*	*	538
04:00	*	618	673	*	*	646	*	*	646
05:00	*	**669**	**750**	*	*	**710**	*	*	**710**
06:00	*	602	667	*	*	634	*	*	634
07:00	*	568	689	*	*	628	*	*	628
08:00	*	606	688	*	*	647	*	*	647
09:00	*	571	620	*	*	596	*	*	596
10:00	*	444	449	*	*	446	*	*	446
11:00	*	323	350	*	*	336	*	*	336
Day Total	0	4985	8065	2016	0	7763	0	0	7763
% Avg. WkDay	0.0%	64.2%	103.9%	26.0%	0.0%				
% Avg. Week	0.0%	64.2%	103.9%	26.0%	0.0%	100.0%	0.0%	0.0%	
AM Peak			11:00	11:00		11:00			11:00
Vol.			393	363		378			378
PM Peak		17:00	17:00	12:00		17:00			17:00
Vol.		669	750	405		710			710
Grand Total	0	4985	8065	2016	0	7763	0	0	7763



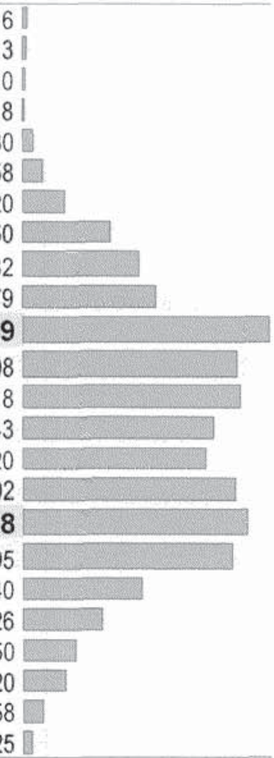
ADT Not Calculated

City of Palmdale
Vehicle Volume Counts

Site Code: 000000004263
Station ID: 4263
10th Street West
Avenue M
Date Start: 06-Nov-12

Weather: Clear and Dry
Counted By: JF and VH
Board #: 4263
Location: SB 10TH ST W S/O AVE M

Start Time	Mon 05-Nov-12	Tue 06-Nov-12	Wed 07-Nov-12	Thu 08-Nov-12	Fri 09-Nov-12	Average Day	Sat 10-Nov-12	Sun 11-Nov-12	Week Average
12:00 AM	*	*	17	14	*	16	*	*	16
01:00	*	*	13	13	*	13	*	*	13
02:00	*	*	11	9	*	10	*	*	10
03:00	*	*	9	8	*	8	*	*	8
04:00	*	*	40	19	*	30	*	*	30
05:00	*	*	58	57	*	58	*	*	58
06:00	*	*	125	115	*	120	*	*	120
07:00	*	*	269	230	*	250	*	*	250
08:00	*	*	315	**348**	*	332	*	*	332
09:00	*	*	443	315	*	379	*	*	379
10:00	*	*	**699**	*	*	**699**	*	*	**699**
11:00	*	**633**	584	*	*	608	*	*	608
12:00 PM	*	620	615	*	*	618	*	*	618
01:00	*	526	560	*	*	543	*	*	543
02:00	*	521	519	*	*	520	*	*	520
03:00	*	575	628	*	*	602	*	*	602
04:00	*	**655**	621	*	*	**638**	*	*	**638**
05:00	*	550	**640**	*	*	595	*	*	595
06:00	*	341	338	*	*	340	*	*	340
07:00	*	206	246	*	*	226	*	*	226
08:00	*	147	152	*	*	150	*	*	150
09:00	*	113	127	*	*	120	*	*	120
10:00	*	52	63	*	*	58	*	*	58
11:00	*	21	29	*	*	25	*	*	25
Day Total	0	4960	7121	1128	0	6958	0	0	6958
% Avg. WkDay	0.0%	71.3%	102.3%	16.2%	0.0%				
% Avg. Week	0.0%	71.3%	102.3%	16.2%	0.0%	100.0%	0.0%	0.0%	
AM Peak		11:00	10:00	08:00		10:00			10:00
Vol.		633	699	348		699			699
PM Peak		16:00	17:00			16:00			16:00
Vol.		655	640			638			638
Grand Total	0	4960	7121	1128	0	6958	0	0	6958



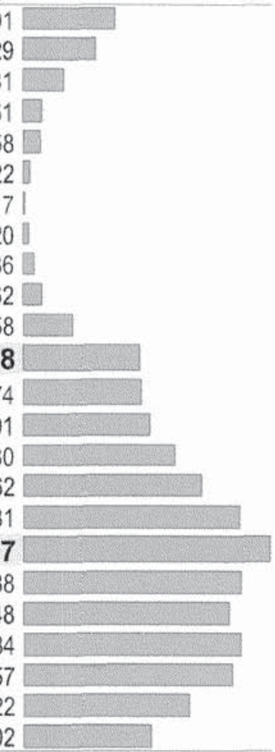
ADT Not Calculated

City of Palmdale
Vehicle Volume Counts

Weather: Clear and Dry
Counted By: JF and VH
Board #: 16403
Location: NB 10TH ST W N/O AVE O

Site Code: 16403
Station ID: 16403
10th Street West
Avenue O
Date Start: 06-Nov-12

Start Time	Mon 05-Nov-12	Tue 06-Nov-12	Wed 07-Nov-12	Thu 08-Nov-12	Fri 09-Nov-12	Average Day	Sat 10-Nov-12	Sun 11-Nov-12	Week Average
12:00 AM	*	*	300	282	*	291	*	*	291
01:00	*	*	213	245	*	229	*	*	229
02:00	*	*	137	125	*	131	*	*	131
03:00	*	*	64	58	*	61	*	*	61
04:00	*	*	64	52	*	58	*	*	58
05:00	*	*	22	21	*	22	*	*	22
06:00	*	*	7	7	*	7	*	*	7
07:00	*	*	17	22	*	20	*	*	20
08:00	*	*	33	40	*	36	*	*	36
09:00	*	*	66	59	*	62	*	*	62
10:00	*	*	150	165	*	158	*	*	158
11:00	*	*	**376**	**361**	*	**368**	*	*	**368**
12:00 PM	*	*	365	**383**	*	374	*	*	374
01:00	*	*	401	*	*	401	*	*	401
02:00	*	*	480	*	*	480	*	*	480
03:00	*	616	508	*	*	562	*	*	562
04:00	*	681	681	*	*	681	*	*	681
05:00	*	**801**	**753**	*	*	**777**	*	*	**777**
06:00	*	688	688	*	*	688	*	*	688
07:00	*	622	674	*	*	648	*	*	648
08:00	*	669	698	*	*	684	*	*	684
09:00	*	651	663	*	*	657	*	*	657
10:00	*	498	547	*	*	522	*	*	522
11:00	*	401	402	*	*	402	*	*	402
Day Total	0	5627	8309	1820	0	8319	0	0	8319
% Avg. WkDay	0.0%	67.6%	99.9%	21.9%	0.0%				
% Avg. Week	0.0%	67.6%	99.9%	21.9%	0.0%	100.0%	0.0%	0.0%	
AM Peak			11:00	11:00		11:00			11:00
Vol.			376	361		368			368
PM Peak		17:00	17:00	12:00		17:00			17:00
Vol.		801	753	383		777			777
Grand Total	0	5627	8309	1820	0	8319	0	0	8319



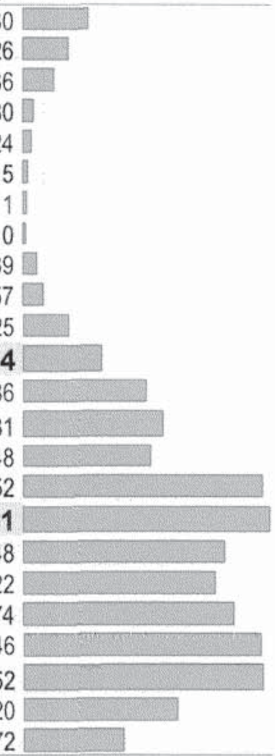
ADT Not Calculated

City of Palmdale
Vehicle Volume Counts

Site Code: 14053
Station ID: 14053
10th Street West
Avenue O
Date Start: 06-Nov-12

Weather: Clear and Dry
Counted By: JF and VH
Board #: 14053
Location: SB 10TH ST W N/O AVE O

Start Time	Mon 05-Nov-12	Tue 06-Nov-12	Wed 07-Nov-12	Thu 08-Nov-12	Fri 09-Nov-12	Average Day	Sat 10-Nov-12	Sun 11-Nov-12	Week Average
12:00 AM	*	*	187	172	*	180	*	*	180
01:00	*	*	122	129	*	126	*	*	126
02:00	*	*	83	90	*	86	*	*	86
03:00	*	*	27	33	*	30	*	*	30
04:00	*	*	25	23	*	24	*	*	24
05:00	*	*	15	15	*	15	*	*	15
06:00	*	*	11	11	*	11	*	*	11
07:00	*	*	10	9	*	10	*	*	10
08:00	*	*	48	30	*	39	*	*	39
09:00	*	*	53	61	*	57	*	*	57
10:00	*	*	136	114	*	125	*	*	125
11:00	*	*	**214**	**215**	*	**214**	*	*	**214**
12:00 PM	*	*	323	350	*	336	*	*	336
01:00	*	*	404	**358**	*	381	*	*	381
02:00	*	*	348	*	*	348	*	*	348
03:00	*	684	621	*	*	652	*	*	652
04:00	*	**698**	644	*	*	**671**	*	*	**671**
05:00	*	534	562	*	*	548	*	*	548
06:00	*	550	493	*	*	522	*	*	522
07:00	*	576	573	*	*	574	*	*	574
08:00	*	660	631	*	*	646	*	*	646
09:00	*	630	**674**	*	*	652	*	*	652
10:00	*	412	428	*	*	420	*	*	420
11:00	*	265	278	*	*	272	*	*	272
Day Total	0	5009	6910	1610	0	6939	0	0	6939
% Avg. WkDay	0.0%	72.2%	99.6%	23.2%	0.0%				
% Avg. Week	0.0%	72.2%	99.6%	23.2%	0.0%	100.0%	0.0%	0.0%	
AM Peak			11:00	11:00		11:00			11:00
Vol.			214	215		214			214
PM Peak		16:00	21:00	13:00		16:00			16:00
Vol.		698	674	358		671			671
Grand Total	0	5009	6910	1610	0	6939	0	0	6939



ADT Not Calculated

APPENDIX 6-D
U.S. CENSUS DATA

P9 | HISPANIC OR LATINO, AND NOT HISPANIC OR LATINO BY RACE

Universe: Total population
2010 Census Summary File 1

NOTE: For information on confidentiality protection, nonsampling error, and definitions, see http://www.census.gov/prod/cen2010/doc/sf1.pdf.

	Block Group 1, Census Tract 9005.01, Los Angeles County, California	Block Group 2, Census Tract 9005.01, Los Angeles County, California	Block Group 1, Census Tract 9005.04, Los Angeles County, California	Block Group 2, Census Tract 9005.04, Los Angeles County, California	Block Group 1, Census Tract 9007.04, Los Angeles County, California
Total:	1,729	2,071	1,580	4,236	2,056
Hispanic or Latino	801	967	649	1,761	776
Not Hispanic or Latino:	928	1,104	931	2,475	1,280
Population of one race:	902	1,022	888	2,394	1,203
White alone	519	444	513	1,193	507
Black or African American alone	345	513	345	897	598
American Indian and Alaska Native alone	9	12	8	23	5
Asian alone	28	36	19	261	87
Native Hawaiian and Other Pacific Islander alone	0	4	3	9	2
Some Other Race alone	1	13	0	11	4
Two or More Races:	26	82	43	81	77
Population of two races:	22	73	39	74	70
White; Black or African American	7	40	15	24	21
White; American Indian and Alaska Native	3	12	5	7	6
White; Asian	1	8	5	21	17
White; Native Hawaiian and Other Pacific Islander	1	0	1	1	4
White; Some Other Race	1	1	0	2	2
Black or African American; American Indian and Alaska Native	5	1	4	4	5
Black or African American; Asian	2	3	1	3	6
Black or African American; Native Hawaiian and Other Pacific Islander	0	6	2	4	0
Black or African American; Some Other Race	2	2	1	1	2
American Indian and Alaska Native; Asian	0	0	0	0	1
American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander	0	0	0	0	0
American Indian and Alaska Native; Some Other Race	0	0	0	0	0
Asian; Native Hawaiian and Other Pacific Islander	0	0	1	2	1
Asian; Some Other Race	0	0	4	0	5
Native Hawaiian and Other Pacific Islander; Some Other Race	0	0	0	5	0
Population of three races:	4	9	4	7	7
White; Black or African American; American Indian and Alaska Native	4	0	2	7	5
White; Black or African American; Asian	0	5	2	0	1
White; Black or African American; Native Hawaiian and Other Pacific Islander	0	1	0	0	0
White; Black or African American; Some Other Race	0	0	0	0	0
White; American Indian and Alaska Native; Asian	0	0	0	0	1
White; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander	0	0	0	0	0
White; American Indian and Alaska Native; Some Other Race	0	0	0	0	0

	Block Group 1, Census Tract 9005.01, Los Angeles County, California	Block Group 2, Census Tract 9005.01, Los Angeles County, California	Block Group 1, Census Tract 9005.04, Los Angeles County, California	Block Group 2, Census Tract 9005.04, Los Angeles County, California	Block Group 1, Census Tract 9007.04, Los Angeles County, California
White; Asian; Native Hawaiian and Other Pacific Islander	0	0	0	0	0
White; Asian; Some Other Race	0	0	0	0	0
White; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0	0	0	0
Black or African American; American Indian and Alaska Native; Asian	0	0	0	0	0
Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander	0	0	0	0	0
Black or African American; American Indian and Alaska Native; Some Other Race	0	3	0	0	0
Black or African American; Asian; Native Hawaiian and Other Pacific Islander	0	0	0	0	0
Black or African American; Asian; Some Other Race	0	0	0	0	0
Black or African American; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0	0	0	0
American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander	0	0	0	0	0
American Indian and Alaska Native; Asian; Some Other Race	0	0	0	0	0
American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0	0	0	0
Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0	0	0	0
Population of four races:	0	0	0	0	0
White; Black or African American; American Indian and Alaska Native; Asian	0	0	0	0	0
White; Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander	0	0	0	0	0
White; Black or African American; American Indian and Alaska Native; Some Other Race	0	0	0	0	0
White; Black or African American; Asian; Native Hawaiian and Other Pacific Islander	0	0	0	0	0
White; Black or African American; Asian; Some Other Race	0	0	0	0	0
White; Black or African American; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0	0	0	0
White; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander	0	0	0	0	0
White; American Indian and Alaska Native; Asian; Some Other Race	0	0	0	0	0
White; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0	0	0	0
White; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0	0	0	0
Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander	0	0	0	0	0
Black or African American; American Indian and Alaska Native; Asian; Some Other Race	0	0	0	0	0
Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0	0	0	0
Black or African American; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0	0	0	0
American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0	0	0	0
Population of five races:	0	0	0	0	0
White; Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander	0	0	0	0	0
White; Black or African American; American Indian and Alaska Native; Asian; Some Other Race	0	0	0	0	0
White; Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0	0	0	0

	Block Group 1, Census Tract 9005.01, Los Angeles County, California	Block Group 2, Census Tract 9005.01, Los Angeles County, California	Block Group 1, Census Tract 9005.04, Los Angeles County, California	Block Group 2, Census Tract 9005.04, Los Angeles County, California	Block Group 1, Census Tract 9007.04, Los Angeles County, California
White; Black or African American; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0	0	0	0
White; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0	0	0	0
Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0	0	0	0
Population of six races:	0	0	0	0	0
White; Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0	0	0	0

	Block Group 1, Census Tract 9102.01, Los Angeles County, California	Block Group 1, Census Tract 9800.04, Los Angeles County, California
Total:	2,267	169
Hispanic or Latino	722	66
Not Hispanic or Latino:	1,545	103
Population of one race:	1,486	97
White alone	1,057	79
Black or African American alone	307	15
American Indian and Alaska Native alone	8	1
Asian alone	110	2
Native Hawaiian and Other Pacific Islander alone	0	0
Some Other Race alone	4	0
Two or More Races:	59	6
Population of two races:	51	6
White; Black or African American	6	0
White; American Indian and Alaska Native	12	3
White; Asian	25	2
White; Native Hawaiian and Other Pacific Islander	0	0
White; Some Other Race	3	1
Black or African American; American Indian and Alaska Native	2	0
Black or African American; Asian	1	0
Black or African American; Native Hawaiian and Other Pacific Islander	0	0
Black or African American; Some Other Race	0	0
American Indian and Alaska Native; Asian	0	0
American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander	0	0
American Indian and Alaska Native; Some Other Race	0	0
Asian; Native Hawaiian and Other Pacific Islander	1	0
Asian; Some Other Race	1	0
Native Hawaiian and Other Pacific Islander; Some Other Race	0	0
Population of three races:	8	0
White; Black or African American; American Indian and Alaska Native	3	0
White; Black or African American; Asian	0	0
White; Black or African American; Native Hawaiian and Other Pacific Islander	2	0
White; Black or African American; Some Other Race	0	0
White; American Indian and Alaska Native; Asian	0	0
White; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander	0	0
White; American Indian and Alaska Native; Some Other Race	0	0
White; Asian; Native Hawaiian and Other Pacific Islander	1	0
White; Asian; Some Other Race	0	0
White; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0
Black or African American; American Indian and Alaska Native; Asian	0	0
Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander	0	0
Black or African American; American Indian and Alaska Native; Some Other Race	0	0
Black or African American; Asian; Native Hawaiian and Other Pacific Islander	0	0
Black or African American; Asian; Some Other Race	1	0
Black or African American; Native Hawaiian and Other Pacific Islander; Some Other Race	1	0
American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander	0	0

	Block Group 1, Census Tract 9102.01, Los Angeles County, California	Block Group 1, Census Tract 9800.04, Los Angeles County, California
American Indian and Alaska Native; Asian; Some Other Race	0	0
American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0
Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0
Population of four races:	0	0
White; Black or African American; American Indian and Alaska Native; Asian	0	0
White; Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander	0	0
White; Black or African American; American Indian and Alaska Native; Some Other Race	0	0
White; Black or African American; Asian; Native Hawaiian and Other Pacific Islander	0	0
White; Black or African American; Asian; Some Other Race	0	0
White; Black or African American; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0
White; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander	0	0
White; American Indian and Alaska Native; Asian; Some Other Race	0	0
White; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0
White; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0
Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander	0	0
Black or African American; American Indian and Alaska Native; Asian; Some Other Race	0	0
Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0
Black or African American; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0
American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0
Population of five races:	0	0
White; Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander	0	0
White; Black or African American; American Indian and Alaska Native; Asian; Some Other Race	0	0
White; Black or African American; American Indian and Alaska Native; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0
White; Black or African American; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0
White; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0
Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0
Population of six races:	0	0
White; Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; Some Other Race	0	0

Source: U.S. Census Bureau, 2010 Census.

P3

RACE

Universe: Total population
2010 Census Summary File 1

NOTE: For information on confidentiality protection, nonsampling error, and definitions, see http://www.census.gov/prod/cen2010/doc/sf1.pdf.

	Block Group 1, Census Tract 9005.01, Los Angeles County, California	Block Group 2, Census Tract 9005.01, Los Angeles County, California	Block Group 1, Census Tract 9005.04, Los Angeles County, California	Block Group 2, Census Tract 9005.04, Los Angeles County, California	Block Group 1, Census Tract 9007.04, Los Angeles County, California
Total:	1,729	2,071	1,580	4,236	2,056
White alone	852	856	744	1,936	798
Black or African American alone	365	531	369	942	637
American Indian and Alaska Native alone	30	32	26	37	13
Asian alone	35	37	20	272	88
Native Hawaiian and Other Pacific Islander alone	0	4	3	9	3
Some Other Race alone	366	483	325	859	395
Two or More Races	81	128	93	181	122

	Block Group 1, Census Tract 9102.01, Los Angeles County, California	Block Group 1, Census Tract 9800.04, Los Angeles County, California
Total:	2,267	169
White alone	1,385	86
Black or African American alone	314	15
American Indian and Alaska Native alone	19	1
Asian alone	116	2
Native Hawaiian and Other Pacific Islander alone	0	0
Some Other Race alone	314	53
Two or More Races	119	12

Source: U.S. Census Bureau, 2010 Census.

S1701 | POVERTY STATUS IN THE PAST 12 MONTHS

2006-2010 American Community Survey 5-Year Estimates

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Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, for 2010, the 2010 Census provides the official counts of the population and housing units for the nation, states, counties, cities and towns. For 2006 to 2009, the Population Estimates Program provides intercensal estimates of the population for the nation, states, and counties.

Subject	California				
	Total		Below poverty level		Percent below poverty level
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Population for whom poverty status is determined	35,877,036	+/-3,983	4,919,945	+/-40,151	13.7%
AGE					
Under 18 years	9,173,776	+/-3,981	1,748,267	+/-20,417	19.1%
Related children under 18 years	9,126,614	+/-4,299	1,705,522	+/-20,353	18.7%
18 to 64 years	22,738,319	+/-2,105	2,826,464	+/-22,118	12.4%
65 years and over	3,964,941	+/-2,052	345,214	+/-4,560	8.7%
SEX					
Male	17,733,247	+/-4,138	2,250,124	+/-19,429	12.7%
Female	18,143,789	+/-4,012	2,669,821	+/-23,173	14.7%
RACE AND HISPANIC OR LATINO ORIGIN					
One race	34,535,670	+/-20,161	4,749,777	+/-40,569	13.8%
White	21,972,223	+/-29,893	2,632,319	+/-24,574	12.0%
Black or African American	2,135,228	+/-6,662	437,531	+/-9,678	20.5%
American Indian and Alaska Native	273,653	+/-5,744	56,188	+/-3,119	20.5%
Asian	4,683,006	+/-8,245	492,797	+/-8,221	10.5%
Native Hawaiian and Other Pacific Islander	137,162	+/-1,984	16,898	+/-1,840	12.3%
Some other race	5,334,398	+/-34,751	1,114,044	+/-19,735	20.9%
Two or more races	1,341,366	+/-20,569	170,168	+/-5,087	12.7%
Hispanic or Latino origin (of any race)	13,209,479	+/-4,092	2,634,845	+/-28,772	19.9%
White alone, not Hispanic or Latino	14,801,363	+/-5,921	1,226,339	+/-15,098	8.3%
EDUCATIONAL ATTAINMENT					
Population 25 years and over	23,141,267	+/-3,014	2,454,478	+/-17,853	10.6%
Less than high school graduate	4,412,392	+/-19,364	978,800	+/-9,321	22.2%
High school graduate (includes equivalency)	4,931,965	+/-24,786	617,690	+/-7,403	12.5%
Some college, associate's degree	6,763,759	+/-18,454	555,492	+/-6,494	8.2%
Bachelor's degree or higher	7,033,151	+/-31,390	302,496	+/-3,957	4.3%
EMPLOYMENT STATUS					
Civilian labor force 16 years and over	18,210,334	+/-16,889	1,480,721	+/-11,324	8.1%
Employed	16,577,884	+/-18,565	1,066,476	+/-10,052	6.4%
Male	9,014,388	+/-11,009	552,131	+/-6,255	6.1%

Subject	California				
	Total		Below poverty level		Percent below poverty level
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Female	7,563,496	+/-11,573	514,345	+/-6,061	6.8%
Unemployed	1,632,450	+/-9,002	414,245	+/-5,522	25.4%
Male	894,120	+/-6,188	212,139	+/-3,877	23.7%
Female	738,330	+/-5,924	202,106	+/-3,427	27.4%
WORK EXPERIENCE					
Population 16 years and over	27,823,776	+/-4,122	3,367,733	+/-24,001	12.1%
Worked full-time, year-round in the past 12 months	11,077,919	+/-21,331	314,456	+/-4,490	2.8%
Worked part-time or part-year in the past 12 months	7,642,743	+/-34,264	1,124,055	+/-9,229	14.7%
Did not work	9,103,114	+/-23,328	1,929,222	+/-17,805	21.2%
All Individuals below:					
50 percent of poverty level	2,057,365	+/-23,556	(X)	(X)	(X)
125 percent of poverty level	6,688,036	+/-44,922	(X)	(X)	(X)
150 percent of poverty level	8,454,452	+/-50,340	(X)	(X)	(X)
185 percent of poverty level	10,816,076	+/-59,070	(X)	(X)	(X)
200 percent of poverty level	11,779,509	+/-60,446	(X)	(X)	(X)
Unrelated individuals for whom poverty status is determined	6,328,055	+/-29,292	1,496,804	+/-12,516	23.7%
Male	3,192,650	+/-21,128	679,467	+/-8,224	21.3%
Female	3,135,405	+/-13,578	817,337	+/-9,133	26.1%
Mean income deficit for unrelated individuals (dollars)	3,461	+/-29	(X)	(X)	(X)
Worked full-time, year-round in the past 12 months	2,605,329	+/-22,124	68,730	+/-2,230	2.6%
Worked less than full-time, year-round in the past 12 months	1,737,905	+/-12,512	551,614	+/-6,770	31.7%
Did not work	1,984,821	+/-9,171	876,460	+/-8,375	44.2%
PERCENT IMPUTED					
Poverty status for individuals	24.7%	(X)	(X)	(X)	(X)

Subject	California	Los Angeles County, California			
	Percent below poverty level	Total		Below poverty level	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Population for whom poverty status is determined	+/-0.1	9,604,871	+/-3,887	1,508,618	+/-16,862
AGE					
Under 18 years	+/-0.2	2,423,763	+/-2,353	543,689	+/-9,054
Related children under 18 years	+/-0.2	2,412,637	+/-2,549	533,662	+/-8,932
18 to 64 years	+/-0.1	6,184,689	+/-3,128	852,292	+/-9,464
65 years and over	+/-0.1	996,419	+/-1,805	112,637	+/-2,702
SEX					
Male	+/-0.1	4,730,017	+/-2,672	684,046	+/-8,691
Female	+/-0.1	4,874,854	+/-2,775	824,572	+/-9,742
RACE AND HISPANIC OR LATINO ORIGIN					
One race	+/-0.1	9,302,585	+/-7,212	1,471,674	+/-16,609
White	+/-0.1	4,886,108	+/-18,713	656,649	+/-10,144
Black or African American	+/-0.4	826,755	+/-3,092	168,323	+/-4,958
American Indian and Alaska Native	+/-1.0	46,740	+/-2,145	8,450	+/-989
Asian	+/-0.2	1,323,468	+/-3,362	146,119	+/-3,811
Native Hawaiian and Other Pacific Islander	+/-1.3	25,979	+/-937	3,839	+/-977
Some other race	+/-0.3	2,193,535	+/-20,698	488,294	+/-11,440
Two or more races	+/-0.4	302,286	+/-6,976	36,944	+/-2,285
Hispanic or Latino origin (of any race)	+/-0.2	4,549,224	+/-1,741	940,271	+/-13,017
White alone, not Hispanic or Latino	+/-0.1	2,718,290	+/-2,474	234,217	+/-5,005
EDUCATIONAL ATTAINMENT					
Population 25 years and over	+/-0.1	6,204,990	+/-2,538	772,190	+/-8,169
Less than high school graduate	+/-0.2	1,488,744	+/-7,656	341,414	+/-4,609
High school graduate (includes equivalency)	+/-0.1	1,312,428	+/-9,747	185,334	+/-3,909
Some college, associate's degree	+/-0.1	1,594,543	+/-6,759	149,570	+/-3,114
Bachelor's degree or higher	+/-0.1	1,809,275	+/-9,640	95,872	+/-2,382
EMPLOYMENT STATUS					
Civilian labor force 16 years and over	+/-0.1	4,933,859	+/-8,731	446,296	+/-5,684
Employed	+/-0.1	4,505,419	+/-8,575	332,631	+/-4,584
Male	+/-0.1	2,457,983	+/-6,382	178,783	+/-3,399
Female	+/-0.1	2,047,436	+/-6,342	153,848	+/-2,682
Unemployed	+/-0.3	428,440	+/-5,333	113,665	+/-2,744
Male	+/-0.4	235,227	+/-3,499	57,744	+/-1,886
Female	+/-0.4	193,213	+/-3,454	55,921	+/-1,749
WORK EXPERIENCE					
Population 16 years and over	+/-0.1	7,481,824	+/-4,321	1,026,107	+/-10,868
Worked full-time, year-round in the past 12 months	+/-0.1	3,076,993	+/-12,338	121,782	+/-2,848
Worked part-time or part-year in the past 12 months	+/-0.1	1,933,800	+/-15,215	304,086	+/-4,579
Did not work	+/-0.2	2,471,031	+/-10,529	600,239	+/-8,034
All Individuals below:					
50 percent of poverty level	(X)	610,272	+/-13,094	(X)	(X)
125 percent of poverty level	(X)	2,060,097	+/-19,526	(X)	(X)
150 percent of poverty level	(X)	2,612,895	+/-21,394	(X)	(X)
185 percent of poverty level	(X)	3,329,911	+/-22,475	(X)	(X)
200 percent of poverty level	(X)	3,614,210	+/-22,203	(X)	(X)
Unrelated individuals for whom poverty status is determined	+/-0.1	1,711,266	+/-10,608	419,332	+/-5,989
Male	+/-0.2	875,044	+/-7,151	187,639	+/-3,983
Female	+/-0.2	836,222	+/-6,150	231,693	+/-4,003

Subject	California	Los Angeles County, California			
	Percent below poverty level	Total		Below poverty level	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Mean income deficit for unrelated individuals (dollars)	(X)	3,594	+/-52	(X)	(X)
Worked full-time, year-round in the past 12 months	+/-0.1	747,884	+/-7,991	24,609	+/-1,324
Worked less than full-time, year-round in the past 12 months	+/-0.3	456,774	+/-5,914	142,345	+/-3,057
Did not work	+/-0.4	506,608	+/-6,258	252,378	+/-4,531
PERCENT IMPUTED					
Poverty status for individuals	(X)	24.4%	(X)	(X)	(X)

Subject	Los Angeles County, California	
	Percent below poverty level	
	Estimate	Margin of Error
Population for whom poverty status is determined	15.7%	+/-0.2
AGE		
Under 18 years	22.4%	+/-0.4
Related children under 18 years	22.1%	+/-0.4
18 to 64 years	13.8%	+/-0.2
65 years and over	11.3%	+/-0.3
SEX		
Male	14.5%	+/-0.2
Female	16.9%	+/-0.2
RACE AND HISPANIC OR LATINO ORIGIN		
One race	15.8%	+/-0.2
White	13.4%	+/-0.2
Black or African American	20.4%	+/-0.6
American Indian and Alaska Native	18.1%	+/-1.9
Asian	11.0%	+/-0.3
Native Hawaiian and Other Pacific Islander	14.8%	+/-3.7
Some other race	22.3%	+/-0.5
Two or more races	12.2%	+/-0.8
Hispanic or Latino origin (of any race)	20.7%	+/-0.3
White alone, not Hispanic or Latino	8.6%	+/-0.2
EDUCATIONAL ATTAINMENT		
Population 25 years and over	12.4%	+/-0.1
Less than high school graduate	22.9%	+/-0.3
High school graduate (includes equivalency)	14.1%	+/-0.3
Some college, associate's degree	9.4%	+/-0.2
Bachelor's degree or higher	5.3%	+/-0.1
EMPLOYMENT STATUS		
Civilian labor force 16 years and over	9.0%	+/-0.1
Employed	7.4%	+/-0.1
Male	7.3%	+/-0.1
Female	7.5%	+/-0.1
Unemployed	26.5%	+/-0.6
Male	24.5%	+/-0.7
Female	28.9%	+/-0.8
WORK EXPERIENCE		
Population 16 years and over	13.7%	+/-0.1
Worked full-time, year-round in the past 12 months	4.0%	+/-0.1
Worked part-time or part-year in the past 12 months	15.7%	+/-0.2
Did not work	24.3%	+/-0.3
All Individuals below:		
50 percent of poverty level	(X)	(X)
125 percent of poverty level	(X)	(X)
150 percent of poverty level	(X)	(X)
185 percent of poverty level	(X)	(X)
200 percent of poverty level	(X)	(X)
Unrelated individuals for whom poverty status is determined	24.5%	+/-0.3
Male	21.4%	+/-0.4
Female	27.7%	+/-0.4

Subject	Los Angeles County, California	
	Percent below poverty level	
	Estimate	Margin of Error
Mean income deficit for unrelated individuals (dollars)	(X)	(X)
Worked full-time, year-round in the past 12 months	3.3%	+/-0.2
Worked less than full-time, year-round in the past 12 months	31.2%	+/-0.5
Did not work	49.8%	+/-0.7
PERCENT IMPUTED		
Poverty status for individuals	(X)	(X)

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

While the 2006-2010 American Community Survey (ACS) data generally reflect the December 2009 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural population, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2000 data. Boundaries for urban areas have not been updated since Census 2000. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Source: U.S. Census Bureau, 2006-2010 American Community Survey

Explanation of Symbols:

1. An '**' entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
2. An '-' entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.
3. An '-' following a median estimate means the median falls in the lowest interval of an open-ended distribution.
4. An '+' following a median estimate means the median falls in the upper interval of an open-ended distribution.
5. An '***' entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
6. An '*****' entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
7. An 'N' entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
8. An '(X)' means that the estimate is not applicable or not available.

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Subject	Census Tract 9005.01, Los Angeles County, California				
	Total		Below poverty level		Percent below poverty level
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Population for whom poverty status is determined	6,496	+/-1,027	1,592	+/-597	24.5%
AGE					
Under 18 years	1,927	+/-441	716	+/-334	37.2%
Related children under 18 years	1,870	+/-410	682	+/-319	36.5%
18 to 64 years	3,954	+/-736	786	+/-364	19.9%
65 years and over	615	+/-149	90	+/-67	14.6%
SEX					
Male	2,994	+/-503	777	+/-342	26.0%
Female	3,502	+/-637	815	+/-329	23.3%
RACE AND HISPANIC OR LATINO ORIGIN					
One race	6,304	+/-1,009	1,580	+/-602	25.1%
White	4,251	+/-1,049	1,115	+/-573	26.2%
Black or African American	1,183	+/-399	399	+/-274	33.7%
American Indian and Alaska Native	42	+/-52	12	+/-20	28.6%
Asian	184	+/-111	0	+/-132	0.0%
Native Hawaiian and Other Pacific Islander	0	+/-132	0	+/-132	-
Some other race	644	+/-297	54	+/-58	8.4%
Two or more races	192	+/-131	12	+/-19	6.3%
Hispanic or Latino origin (of any race)	3,408	+/-949	935	+/-511	27.4%
White alone, not Hispanic or Latino	1,576	+/-363	244	+/-153	15.5%
EDUCATIONAL ATTAINMENT					
Population 25 years and over	3,776	+/-631	738	+/-281	19.5%
Less than high school graduate	966	+/-360	229	+/-147	23.7%
High school graduate (includes equivalency)	1,259	+/-263	352	+/-219	28.0%
Some college, associate's degree	1,198	+/-330	128	+/-76	10.7%
Bachelor's degree or higher	353	+/-129	29	+/-27	8.2%
EMPLOYMENT STATUS					
Civilian labor force 16 years and over	2,628	+/-433	268	+/-99	10.2%
Employed	2,311	+/-398	202	+/-89	8.7%
Male	1,248	+/-242	179	+/-89	14.3%

Subject	Census Tract 9005.01, Los Angeles County, California				
	Total		Below poverty level		Percent below poverty level
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Female	1,063	+/-205	23	+/-25	2.2%
Unemployed	317	+/-149	66	+/-57	20.8%
Male	169	+/-95	11	+/-17	6.5%
Female	148	+/-83	55	+/-53	37.2%
WORK EXPERIENCE					
Population 16 years and over	4,887	+/-758	996	+/-397	20.4%
Worked full-time, year-round in the past 12 months	1,679	+/-363	146	+/-97	8.7%
Worked part-time or part-year in the past 12 months	910	+/-213	149	+/-80	16.4%
Did not work	2,298	+/-527	701	+/-324	30.5%
All Individuals below:					
50 percent of poverty level	471	+/-294	(X)	(X)	(X)
125 percent of poverty level	2,212	+/-679	(X)	(X)	(X)
150 percent of poverty level	2,383	+/-705	(X)	(X)	(X)
185 percent of poverty level	2,819	+/-738	(X)	(X)	(X)
200 percent of poverty level	3,189	+/-870	(X)	(X)	(X)
Unrelated individuals for whom poverty status is determined	674	+/-222	200	+/-154	29.7%
Male	362	+/-152	119	+/-120	32.9%
Female	312	+/-120	81	+/-55	26.0%
Mean income deficit for unrelated individuals (dollars)	6,090	+/-3,111	(X)	(X)	(X)
Worked full-time, year-round in the past 12 months	274	+/-137	0	+/-132	0.0%
Worked less than full-time, year-round in the past 12 months	116	+/-65	40	+/-41	34.5%
Did not work	284	+/-142	160	+/-127	56.3%
PERCENT IMPUTED					
Poverty status for individuals	18.8%	(X)	(X)	(X)	(X)

Subject	Census Tract 9005.01, Los Angeles County, California	Census Tract 9005.04, Los Angeles County, California			
	Percent below poverty level	Total		Below poverty level	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Population for whom poverty status is determined	+/-8.1	5,138	+/-604	696	+/-310
AGE					
Under 18 years	+/-13.3	1,633	+/-284	331	+/-178
Related children under 18 years	+/-13.7	1,617	+/-282	315	+/-172
18 to 64 years	+/-8.2	3,246	+/-414	365	+/-159
65 years and over	+/-10.0	259	+/-66	0	+/-132
SEX					
Male	+/-9.5	2,541	+/-351	278	+/-169
Female	+/-8.7	2,597	+/-340	418	+/-197
RACE AND HISPANIC OR LATINO ORIGIN					
One race	+/-8.5	4,951	+/-604	671	+/-306
White	+/-11.8	1,966	+/-448	345	+/-222
Black or African American	+/-18.1	1,676	+/-420	269	+/-199
American Indian and Alaska Native	+/-57.3	0	+/-132	0	+/-132
Asian	+/-19.4	450	+/-221	28	+/-43
Native Hawaiian and Other Pacific Islander	**	0	+/-132	0	+/-132
Some other race	+/-9.2	859	+/-378	29	+/-30
Two or more races	+/-9.3	187	+/-115	25	+/-37
Hispanic or Latino origin (of any race)	+/-13.2	1,686	+/-380	289	+/-214
White alone, not Hispanic or Latino	+/-9.1	1,237	+/-370	110	+/-124
EDUCATIONAL ATTAINMENT					
Population 25 years and over	+/-6.8	2,820	+/-317	250	+/-118
Less than high school graduate	+/-12.1	547	+/-177	126	+/-75
High school graduate (includes equivalency)	+/-14.4	933	+/-240	10	+/-17
Some college, associate's degree	+/-6.8	898	+/-195	78	+/-73
Bachelor's degree or higher	+/-8.4	442	+/-112	36	+/-50
EMPLOYMENT STATUS					
Civilian labor force 16 years and over	+/-3.9	2,364	+/-347	166	+/-92
Employed	+/-3.8	2,200	+/-337	121	+/-79
Male	+/-6.8	1,110	+/-182	63	+/-48
Female	+/-2.4	1,090	+/-241	58	+/-44
Unemployed	+/-16.1	164	+/-74	45	+/-35
Male	+/-9.8	15	+/-23	0	+/-132
Female	+/-24.9	149	+/-75	45	+/-35
WORK EXPERIENCE					
Population 16 years and over	+/-7.3	3,656	+/-449	405	+/-191
Worked full-time, year-round in the past 12 months	+/-5.8	1,800	+/-333	43	+/-37
Worked part-time or part-year in the past 12 months	+/-8.6	552	+/-161	89	+/-73
Did not work	+/-11.2	1,304	+/-229	273	+/-146
All Individuals below:					
50 percent of poverty level	(X)	241	+/-169	(X)	(X)
125 percent of poverty level	(X)	882	+/-382	(X)	(X)
150 percent of poverty level	(X)	1,110	+/-457	(X)	(X)
185 percent of poverty level	(X)	1,508	+/-486	(X)	(X)
200 percent of poverty level	(X)	1,765	+/-473	(X)	(X)
Unrelated individuals for whom poverty status is determined	+/-18.1	536	+/-162	78	+/-52

Subject	Census Tract 9005.01, Los Angeles County, California	Census Tract 9005.04, Los Angeles County, California			
	Percent below poverty level	Total		Below poverty level	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Male	+/-25.3	252	+/-115	11	+/-17
Female	+/-15.3	284	+/-101	67	+/-50
Mean income deficit for unrelated individuals (dollars)	(X)	N	N	(X)	(X)
Worked full-time, year-round in the past 12 months	+/-13.6	320	+/-134	4	+/-7
Worked less than full-time, year-round in the past 12 months	+/-32.0	113	+/-67	25	+/-29
Did not work	+/-24.9	103	+/-60	49	+/-39
PERCENT IMPUTED					
Poverty status for individuals	(X)	15.9%	(X)	(X)	(X)

Subject	Census Tract 9005.04, Los Angeles County, California		Census Tract 9007.04, Los Angeles County, California		
	Percent below poverty level		Total		Below poverty level
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Population for whom poverty status is determined	13.5%	+/-6.2	2,862	+/-316	814
AGE					
Under 18 years	20.3%	+/-10.8	762	+/-208	330
Related children under 18 years	19.5%	+/-10.6	762	+/-208	330
18 to 64 years	11.2%	+/-5.0	1,993	+/-248	424
65 years and over	0.0%	+/-14.3	107	+/-37	60
SEX					
Male	10.9%	+/-6.9	1,479	+/-204	259
Female	16.1%	+/-7.4	1,383	+/-235	555
RACE AND HISPANIC OR LATINO ORIGIN					
One race	13.6%	+/-6.3	2,750	+/-326	784
White	17.5%	+/-10.3	1,334	+/-276	363
Black or African American	16.1%	+/-12.0	1,086	+/-264	371
American Indian and Alaska Native	-	**	29	+/-31	18
Asian	6.2%	+/-11.1	88	+/-65	19
Native Hawaiian and Other Pacific Islander	-	**	13	+/-20	13
Some other race	3.4%	+/-3.5	200	+/-136	0
Two or more races	13.4%	+/-20.3	112	+/-78	30
Hispanic or Latino origin (of any race)	17.1%	+/-13.7	572	+/-221	162
White alone, not Hispanic or Latino	8.9%	+/-9.9	974	+/-215	201
EDUCATIONAL ATTAINMENT					
Population 25 years and over	8.9%	+/-4.3	1,592	+/-192	350
Less than high school graduate	23.0%	+/-12.7	203	+/-102	75
High school graduate (includes equivalency)	1.1%	+/-1.8	534	+/-159	121
Some college, associate's degree	8.7%	+/-7.8	524	+/-134	112
Bachelor's degree or higher	8.1%	+/-11.3	331	+/-135	42
EMPLOYMENT STATUS					
Civilian labor force 16 years and over	7.0%	+/-3.9	1,511	+/-221	295
Employed	5.5%	+/-3.7	1,384	+/-207	229
Male	5.7%	+/-4.6	726	+/-161	52
Female	5.3%	+/-4.0	658	+/-148	177
Unemployed	27.4%	+/-18.3	127	+/-71	66
Male	0.0%	+/-84.9	76	+/-44	22
Female	30.2%	+/-20.8	51	+/-47	44
WORK EXPERIENCE					
Population 16 years and over	11.1%	+/-5.4	2,172	+/-276	508
Worked full-time, year-round in the past 12 months	2.4%	+/-2.2	1,075	+/-212	75
Worked part-time or part-year in the past 12 months	16.1%	+/-11.6	489	+/-160	209
Did not work	20.9%	+/-10.3	608	+/-209	224
All Individuals below:					
50 percent of poverty level	(X)	(X)	208	+/-131	(X)
125 percent of poverty level	(X)	(X)	1,093	+/-330	(X)
150 percent of poverty level	(X)	(X)	1,146	+/-331	(X)
185 percent of poverty level	(X)	(X)	1,565	+/-397	(X)
200 percent of poverty level	(X)	(X)	1,751	+/-371	(X)
Unrelated individuals for whom poverty status is determined	14.6%	+/-10.1	1,029	+/-221	263
Male	4.4%	+/-6.8	659	+/-168	93
Female	23.6%	+/-17.0	370	+/-112	170

Subject	Census Tract 9005.04, Los Angeles County, California		Census Tract 9007.04, Los Angeles County, California		
	Percent below poverty level		Total		Below poverty level
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Mean income deficit for unrelated individuals (dollars)	(X)	(X)	2,380	+/-1,294	(X)
Worked full-time, year-round in the past 12 months	1.3%	+/-2.2	573	+/-166	31
Worked less than full-time, year-round in the past 12 months	22.1%	+/-27.4	228	+/-128	89
Did not work	47.6%	+/-24.0	228	+/-74	143
PERCENT IMPUTED					
Poverty status for individuals	(X)	(X)	11.2%	(X)	(X)

Subject	Census Tract 9007.04, Los Angeles County, California			Census Tract 9102.01, Los Angeles County, California	
	Below poverty level	Percent below poverty level		Total	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Population for whom poverty status is determined	+/-267	28.4%	+/-8.0	4,038	+/-498
AGE					
Under 18 years	+/-203	43.3%	+/-18.5	1,390	+/-307
Related children under 18 years	+/-203	43.3%	+/-18.5	1,386	+/-307
18 to 64 years	+/-122	21.3%	+/-5.6	2,259	+/-265
65 years and over	+/-31	56.1%	+/-20.9	389	+/-94
SEX					
Male	+/-119	17.5%	+/-7.9	1,813	+/-236
Female	+/-181	40.1%	+/-9.2	2,225	+/-332
RACE AND HISPANIC OR LATINO ORIGIN					
One race	+/-262	28.5%	+/-8.2	3,845	+/-491
White	+/-193	27.2%	+/-11.5	1,539	+/-329
Black or African American	+/-189	34.2%	+/-14.9	430	+/-241
American Indian and Alaska Native	+/-27	62.1%	+/-54.7	84	+/-99
Asian	+/-29	21.6%	+/-33.3	145	+/-142
Native Hawaiian and Other Pacific Islander	+/-20	100.0%	+/-91.2	0	+/-132
Some other race	+/-132	0.0%	+/-18.0	1,647	+/-610
Two or more races	+/-37	26.8%	+/-33.3	193	+/-218
Hispanic or Latino origin (of any race)	+/-153	28.3%	+/-20.6	2,187	+/-495
White alone, not Hispanic or Latino	+/-119	20.6%	+/-9.7	1,063	+/-172
EDUCATIONAL ATTAINMENT					
Population 25 years and over	+/-88	22.0%	+/-5.3	2,299	+/-215
Less than high school graduate	+/-44	36.9%	+/-22.7	579	+/-193
High school graduate (includes equivalency)	+/-80	22.7%	+/-12.4	538	+/-154
Some college, associate's degree	+/-76	21.4%	+/-13.6	836	+/-174
Bachelor's degree or higher	+/-45	12.7%	+/-12.7	346	+/-125
EMPLOYMENT STATUS					
Civilian labor force 16 years and over	+/-106	19.5%	+/-6.4	1,556	+/-280
Employed	+/-99	16.5%	+/-6.9	1,189	+/-250
Male	+/-55	7.2%	+/-7.4	628	+/-175
Female	+/-80	26.9%	+/-9.9	561	+/-125
Unemployed	+/-56	52.0%	+/-30.3	367	+/-136
Male	+/-25	28.9%	+/-32.4	233	+/-121
Female	+/-45	86.3%	+/-24.1	134	+/-73
WORK EXPERIENCE					
Population 16 years and over	+/-129	23.4%	+/-5.5	2,745	+/-261
Worked full-time, year-round in the past 12 months	+/-71	7.0%	+/-6.3	715	+/-198
Worked part-time or part-year in the past 12 months	+/-100	42.7%	+/-14.4	668	+/-149
Did not work	+/-82	36.8%	+/-12.7	1,362	+/-273
All Individuals below:					
50 percent of poverty level	(X)	(X)	(X)	507	+/-425
125 percent of poverty level	(X)	(X)	(X)	1,646	+/-663
150 percent of poverty level	(X)	(X)	(X)	1,734	+/-670
185 percent of poverty level	(X)	(X)	(X)	1,959	+/-690
200 percent of poverty level	(X)	(X)	(X)	2,166	+/-672
Unrelated individuals for whom poverty status is determined	+/-89	25.6%	+/-7.5	481	+/-144
Male	+/-68	14.1%	+/-10.1	236	+/-113
Female	+/-76	45.9%	+/-15.4	245	+/-94

Subject	Census Tract 9007.04, Los Angeles County, California			Census Tract 9102.01, Los Angeles County, California	
	Below poverty level	Percent below poverty level		Total	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Mean income deficit for unrelated individuals (dollars)	(X)	(X)	(X)	2,203	+/-1,618
Worked full-time, year-round in the past 12 months	+/-48	5.4%	+/-8.3	101	+/-68
Worked less than full-time, year-round in the past 12 months	+/-58	39.0%	+/-13.9	91	+/-50
Did not work	+/-55	62.7%	+/-14.9	289	+/-125
PERCENT IMPUTED					
Poverty status for individuals	(X)	(X)	(X)	29.3%	(X)

Subject	Census Tract 9102.01, Los Angeles County, California				Census Tract 9800.04, Los Angeles County, California
	Below poverty level		Percent below poverty level		Total
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Population for whom poverty status is determined	1,358	+/-646	33.6%	+/-13.9	0
AGE					
Under 18 years	646	+/-335	46.5%	+/-19.3	0
Related children under 18 years	642	+/-336	46.3%	+/-19.4	0
18 to 64 years	663	+/-305	29.3%	+/-12.3	0
65 years and over	49	+/-67	12.6%	+/-15.7	0
SEX					
Male	557	+/-288	30.7%	+/-14.9	0
Female	801	+/-380	36.0%	+/-14.3	0
RACE AND HISPANIC OR LATINO ORIGIN					
One race	1,324	+/-645	34.4%	+/-13.9	0
White	50	+/-40	3.2%	+/-2.6	0
Black or African American	178	+/-169	41.4%	+/-25.1	0
American Indian and Alaska Native	84	+/-99	100.0%	+/-35.6	0
Asian	92	+/-125	63.4%	+/-39.0	0
Native Hawaiian and Other Pacific Islander	0	+/-132	-	**	0
Some other race	920	+/-606	55.9%	+/-21.2	0
Two or more races	34	+/-56	17.6%	+/-39.4	0
Hispanic or Latino origin (of any race)	983	+/-592	44.9%	+/-20.8	0
White alone, not Hispanic or Latino	34	+/-31	3.2%	+/-2.9	0
EDUCATIONAL ATTAINMENT					
Population 25 years and over	586	+/-281	25.5%	+/-11.7	0
Less than high school graduate	255	+/-145	44.0%	+/-19.8	0
High school graduate (includes equivalency)	127	+/-107	23.6%	+/-16.8	0
Some college, associate's degree	185	+/-151	22.1%	+/-16.0	0
Bachelor's degree or higher	19	+/-23	5.5%	+/-6.8	0
EMPLOYMENT STATUS					
Civilian labor force 16 years and over	290	+/-160	18.6%	+/-10.0	0
Employed	154	+/-86	13.0%	+/-8.0	0
Male	61	+/-61	9.7%	+/-9.2	0
Female	93	+/-84	16.6%	+/-15.0	0
Unemployed	136	+/-116	37.1%	+/-22.6	0
Male	85	+/-103	36.5%	+/-32.0	0
Female	51	+/-57	38.1%	+/-30.7	0
WORK EXPERIENCE					
Population 16 years and over	744	+/-325	27.1%	+/-11.0	0
Worked full-time, year-round in the past 12 months	73	+/-51	10.2%	+/-7.1	0
Worked part-time or part-year in the past 12 months	114	+/-81	17.1%	+/-12.6	0
Did not work	557	+/-268	40.9%	+/-13.0	0
All Individuals below:					
50 percent of poverty level	(X)	(X)	(X)	(X)	0
125 percent of poverty level	(X)	(X)	(X)	(X)	0
150 percent of poverty level	(X)	(X)	(X)	(X)	0
185 percent of poverty level	(X)	(X)	(X)	(X)	0
200 percent of poverty level	(X)	(X)	(X)	(X)	0
Unrelated individuals for whom poverty status is determined	178	+/-88	37.0%	+/-13.4	0
Male	96	+/-87	40.7%	+/-23.9	0

Subject	Census Tract 9102.01, Los Angeles County, California				Census Tract 9800.04, Los Angeles County, California
	Below poverty level		Percent below poverty level		Total
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Female	82	+/-54	33.5%	+/-18.8	0
Mean income deficit for unrelated individuals (dollars)	(X)	(X)	(X)	(X)	-
Worked full-time, year-round in the past 12 months	0	+/-132	0.0%	+/-31.5	0
Worked less than full-time, year-round in the past 12 months	46	+/-50	50.5%	+/-36.0	0
Did not work	132	+/-92	45.7%	+/-19.6	0
PERCENT IMPUTED					
Poverty status for individuals	(X)	(X)	(X)	(X)	-

Subject	Census Tract 9800.04, Los Angeles County, California				
	Total	Below poverty level		Percent below poverty level	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Population for whom poverty status is determined	+/-132	0	+/-132	-	**
AGE					
Under 18 years	+/-132	0	+/-132	-	**
Related children under 18 years	+/-132	0	+/-132	-	**
18 to 64 years	+/-132	0	+/-132	-	**
65 years and over	+/-132	0	+/-132	-	**
SEX					
Male	+/-132	0	+/-132	-	**
Female	+/-132	0	+/-132	-	**
RACE AND HISPANIC OR LATINO ORIGIN					
One race	+/-132	0	+/-132	-	**
White	+/-132	0	+/-132	-	**
Black or African American	+/-132	0	+/-132	-	**
American Indian and Alaska Native	+/-132	0	+/-132	-	**
Asian	+/-132	0	+/-132	-	**
Native Hawaiian and Other Pacific Islander	+/-132	0	+/-132	-	**
Some other race	+/-132	0	+/-132	-	**
Two or more races	+/-132	0	+/-132	-	**
Hispanic or Latino origin (of any race)	+/-132	0	+/-132	-	**
White alone, not Hispanic or Latino	+/-132	0	+/-132	-	**
EDUCATIONAL ATTAINMENT					
Population 25 years and over	+/-132	0	+/-132	-	**
Less than high school graduate	+/-132	0	+/-132	-	**
High school graduate (includes equivalency)	+/-132	0	+/-132	-	**
Some college, associate's degree	+/-132	0	+/-132	-	**
Bachelor's degree or higher	+/-132	0	+/-132	-	**
EMPLOYMENT STATUS					
Civilian labor force 16 years and over	+/-132	0	+/-132	-	**
Employed	+/-132	0	+/-132	-	**
Male	+/-132	0	+/-132	-	**
Female	+/-132	0	+/-132	-	**
Unemployed	+/-132	0	+/-132	-	**
Male	+/-132	0	+/-132	-	**
Female	+/-132	0	+/-132	-	**
WORK EXPERIENCE					
Population 16 years and over	+/-132	0	+/-132	-	**
Worked full-time, year-round in the past 12 months	+/-132	0	+/-132	-	**
Worked part-time or part-year in the past 12 months	+/-132	0	+/-132	-	**
Did not work	+/-132	0	+/-132	-	**
All Individuals below:					
50 percent of poverty level	+/-132	(X)	(X)	(X)	(X)
125 percent of poverty level	+/-132	(X)	(X)	(X)	(X)
150 percent of poverty level	+/-132	(X)	(X)	(X)	(X)
185 percent of poverty level	+/-132	(X)	(X)	(X)	(X)
200 percent of poverty level	+/-132	(X)	(X)	(X)	(X)
Unrelated individuals for whom poverty status is determined	+/-132	0	+/-132	-	**
Male	+/-132	0	+/-132	-	**
Female	+/-132	0	+/-132	-	**

Subject	Census Tract 9800.04, Los Angeles County, California				
	Total	Below poverty level		Percent below poverty level	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Mean income deficit for unrelated individuals (dollars)	**	(X)	(X)	(X)	(X)
Worked full-time, year-round in the past 12 months	+/-132	0	+/-132	-	**
Worked less than full-time, year-round in the past 12 months	+/-132	0	+/-132	-	**
Did not work	+/-132	0	+/-132	-	**
PERCENT IMPUTED					
Poverty status for individuals	(X)	(X)	(X)	(X)	(X)

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

While the 2006-2010 American Community Survey (ACS) data generally reflect the December 2009 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural population, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2000 data. Boundaries for urban areas have not been updated since Census 2000. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Source: U.S. Census Bureau, 2006-2010 American Community Survey

Explanation of Symbols:

1. An '**' entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
2. An '-' entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.
3. An '-' following a median estimate means the median falls in the lowest interval of an open-ended distribution.
4. An '+' following a median estimate means the median falls in the upper interval of an open-ended distribution.
5. An '***' entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
6. An '*****' entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
7. An 'N' entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
8. An '(X)' means that the estimate is not applicable or not available.

APPENDIX 6-E

FAA NO HAZARD DETERMINATION AND NOTICE OF PROPOSED CASES

Federal Aviation Administration

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Proposed Case for : 2015-AWP-7001-OE

For information only.
This proposal has not yet been studied. Study outcomes will be posted at a later date.
Public comments are not requested, and will not be considered at this time.

Overview

Study (ASN):	2015-AWP-7001-OE	**Received Date:**	06/29/2015
Prior Study:	2008-AWP-4531-OE	**Entered Date:**	06/29/2015
Status:	Work In Progress	**Map:**	View Map

Construction Info

Notice Of:	CONSTR
Duration:	PERM (Months: 0 Days: 0)
Work Schedule:	05/01/2017 to 05/31/2019

Structure Summary

Structure Type:	Stack
Structure Name:	11UHN
FCC Number:	

Structure Details

Latitude (NAD 83):	34° 38' 22.54" N
Longitude (NAD 83):	118° 06' 22.63" W
Datum:	NAD 83
City:	Palmdale
State:	CA
Nearest County:	Los Angeles

Height and Elevation

	Proposed
Site Elevation:	2501
Structure Height:	160
Total Height (AMSL):	2661

Frequencies

Low Freq	High Freq	Unit	ERP	Unit

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Federal Aviation Administration

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Proposed Case for : 2015-AWP-7002-OE

For information only.
This proposal has not yet been studied. Study outcomes will be posted at a later date.
Public comments are not requested, and will not be considered at this time.

Overview

Study (ASN):	2015-AWP-7002-OE	**Received Date:**	06/29/2015
Prior Study:	2008-AWP-4532-OE	**Entered Date:**	06/29/2015
Status:	Work In Progress	**Map:**	View Map

Construction Info

Notice Of:	CONSTR
Duration:	PERM (Months: 0 Days: 0)
Work Schedule:	05/01/2017 to 05/31/2019

Structure Summary

Structure Type:	Stack
Structure Name:	12UHN
FCC Number:	

Structure Details

Latitude (NAD 83):	34° 38' 23.83" N
Longitude (NAD 83):	118° 06' 22.65" W
Datum:	NAD 83
City:	Palmdale
State:	CA
Nearest County:	Los Angeles

Height and Elevation

	Proposed
Site Elevation:	2501
Structure Height:	160
Total Height (AMSL):	2661

Frequencies

Low Freq	High Freq	Unit	ERP	Unit

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Federal Aviation Administration

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Proposed Case for : 2015-AWP-7003-OE

For information only.
This proposal has not yet been studied. Study outcomes will be posted at a later date.
Public comments are not requested, and will not be considered at this time.

Overview

Study (ASN):	2015-AWP-7003-OE	**Received Date:**	06/29/2015
Prior Study:		**Entered Date:**	06/29/2015
Status:	Work In Progress	**Map:**	View Map

Construction Info

Notice Of:	CONSTR
Duration:	TEMP (Months: 18 Days: 0)
Work Schedule:	05/01/2017 to 05/31/2019

Structure Summary

Structure Type:	Crane
Structure Name:	HRSG Erection Crane
FCC Number:	

Structure Details

Latitude (NAD 83):	34° 38' 23.19" N
Longitude (NAD 83):	118° 06' 22.64" W
Datum:	NAD 83
City:	Palmdale
State:	CA
Nearest County:	Los Angeles

Height and Elevation

	Proposed
Site Elevation:	2501
Structure Height:	250
Total Height (AMSL):	2751

Frequencies

Low Freq	High Freq	Unit	ERP	Unit

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Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
2601 Meacham Boulevard
Fort Worth, TX 76193

Aeronautical Study No.
2015-AWP-7001-OE
Prior Study No.
2008-AWP-4531-OE

Issued Date: 07/16/2015

Thomas Johns
Palmdale Energy, LLC
801 Second Avenue
Suite 1150
Seattle, WA 98104

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Stack 11UHN
Location:	Palmdale, CA
Latitude:	34-38-22.54N NAD 83
Longitude:	118-06-22.63W
Heights:	2501 feet site elevation (SE)
	160 feet above ground level (AGL)
	2661 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed and maintained in accordance with FAA Advisory circular 70/7460-1 K Change 2.

This determination expires on 01/16/2017 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates , heights, frequency(ies) and power . Any changes in coordinates , heights, and frequencies or use of greater power will void this determination. Any future construction or alteration , including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

If we can be of further assistance, please contact our office at (310) 725-6557. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2015-AWP-7001-OE.

Signature Control No: 256374593-258091889 (DNE)

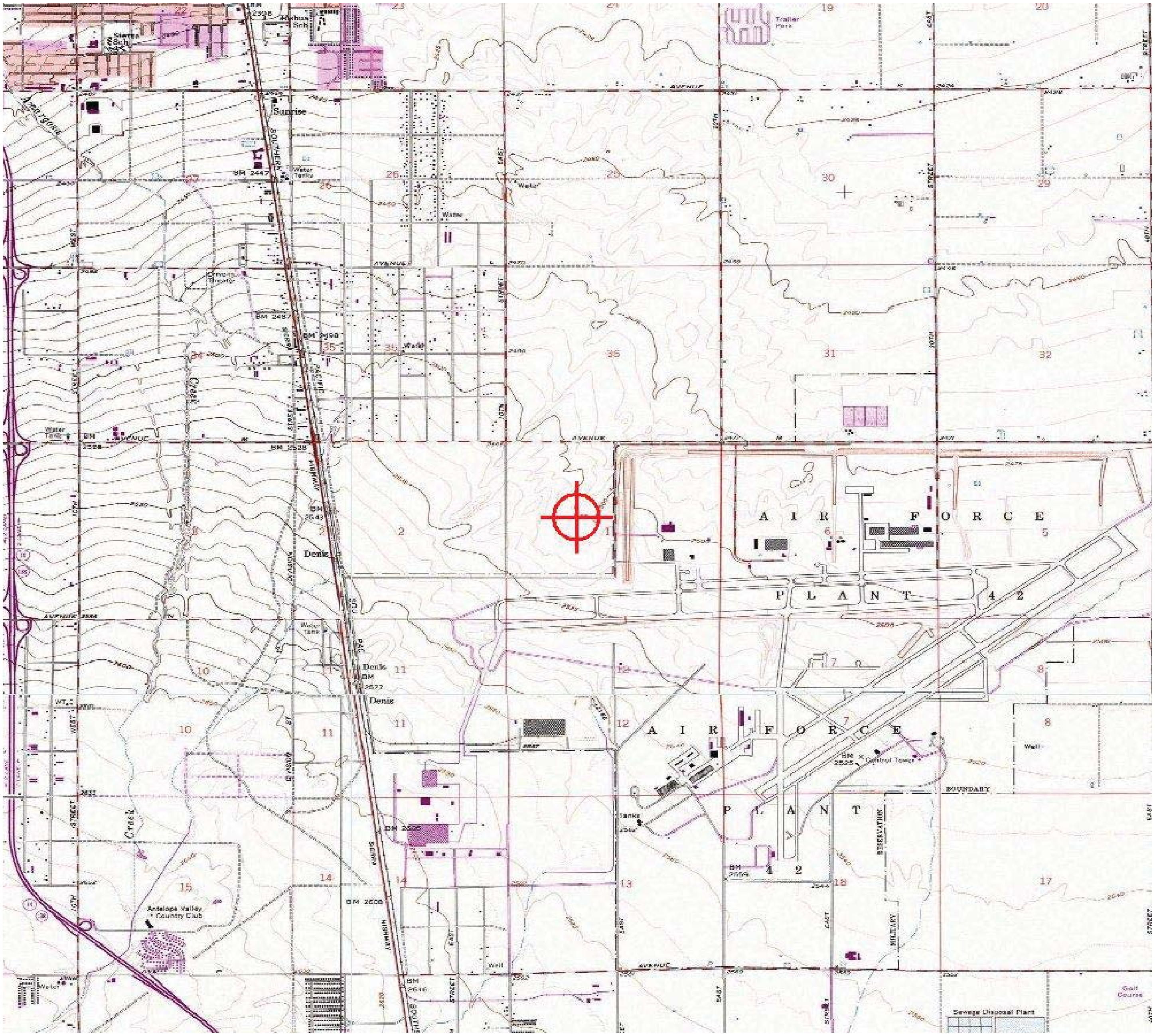
Karen McDonald
Specialist

Attachment(s)
Case Description
Map(s)

Case Description for ASN 2015-AWP-7001-OE

The power island heat recovery steam generator (HRSG) will have an exhaust stack (Stack 11UHN) with a diameter of 22 feet and a height not to exceed 160' (agl). The adjoining HRSG's foot print will be approximately 155 feet long by 65 feet wide and a height of 98 feet.

TOPO Map for ASN 2015-AWP-7001-OE



Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
2601 Meacham Boulevard
Fort Worth, TX 76193

Aeronautical Study No.
2015-AWP-7002-OE
Prior Study No.
2008-AWP-4532-OE

Issued Date: 07/16/2015

Thomas Johns
Palmdale Energy, LLC
801 Second Avenue
Suite 1150
Seattle, WA 98104

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Stack 12UHN
Location:	Palmdale, CA
Latitude:	34-38-23.83N NAD 83
Longitude:	118-06-22.65W
Heights:	2501 feet site elevation (SE)
	160 feet above ground level (AGL)
	2661 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed and maintained in accordance with FAA Advisory circular 70/7460-1 K Change 2.

This determination expires on 01/16/2017 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates , heights, frequency(ies) and power . Any changes in coordinates , heights, and frequencies or use of greater power will void this determination. Any future construction or alteration , including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

If we can be of further assistance, please contact our office at (310) 725-6557. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2015-AWP-7002-OE.

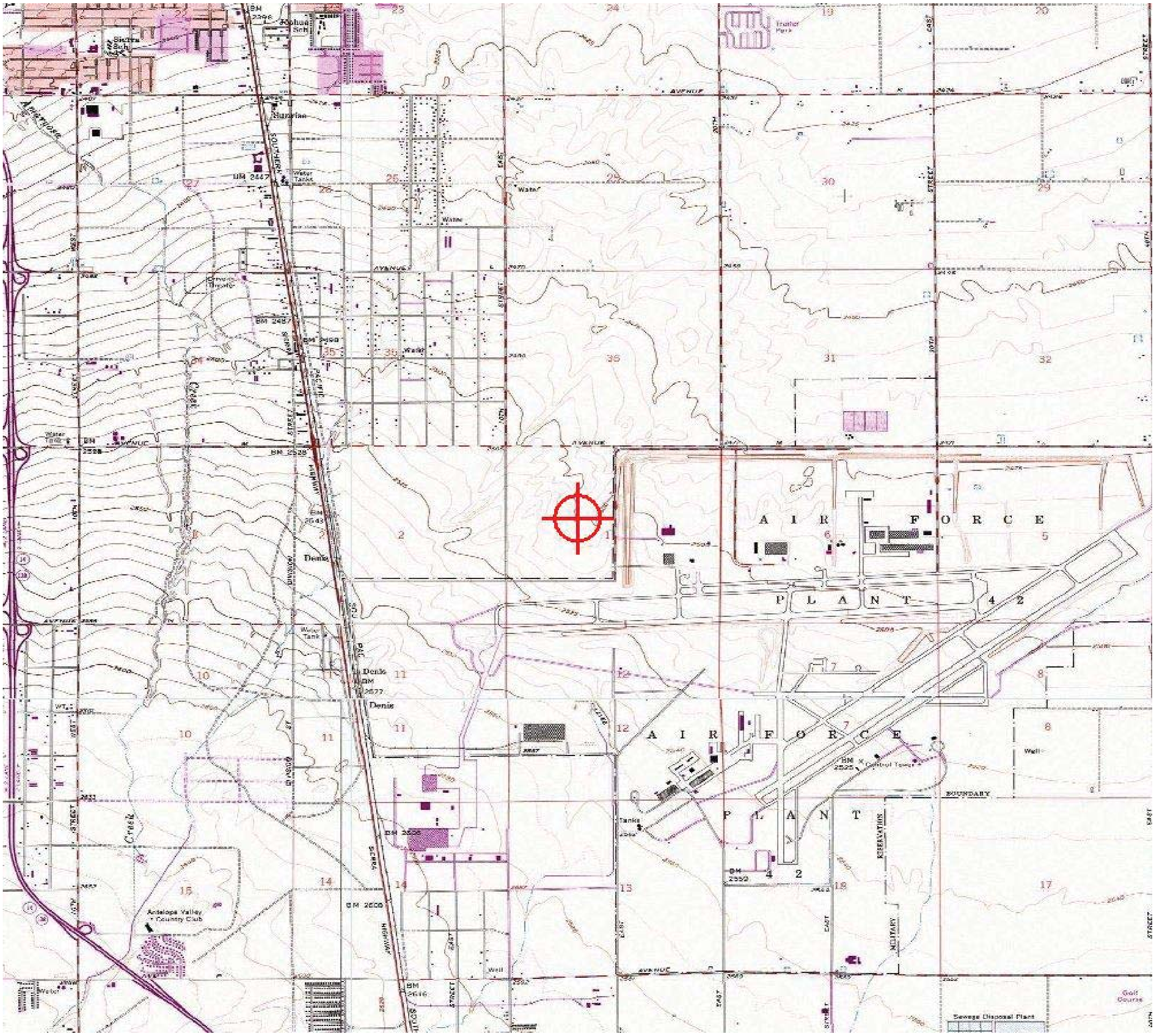
Signature Control No: 256374596-258091890 (DNE)
Karen McDonald
Specialist

Attachment(s)
Case Description
Map(s)

Case Description for ASN 2015-AWP-7002-OE

The power island heat recovery steam generator (HRSG) will have an exhaust stack (Stack 11UHN) with a diameter of 22 feet and a height not to exceed 160' (agl). The adjoining HRSG's foot print will be approximately 155 feet long by 65 feet wide and a height of 98 feet.

TOPO Map for ASN 2015-AWP-7002-OE



Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
2601 Meacham Boulevard
Fort Worth, TX 76193

Aeronautical Study No.
2015-AWP-7003-OE

Issued Date: 07/16/2015

Thomas Johns
Palmdale Energy, LLC
801 Second Avenue
Suite 1150
Seattle, WA 98104

**** THIS IS NOT A DETERMINATION ****

Additional information is required before we can complete an aeronautical study concerning:

Structure:	Crane HRSG Erection Crane
Location:	Palmdale, CA
Latitude:	34-38-23.19N NAD 83
Longitude:	118-06-22.64W
Heights:	2501 feet site elevation (SE)
	250 feet above ground level (AGL)
	2751 feet above mean sea level (AMSL)

A 2C certified survey is required to accurately evaluate your proposal. The survey we require must be developed by a registered surveying firm in the state the survey is performed. Survey data must be based on the North American Datum of 1983, provided in geographic latitude and longitude coordinates (degrees, minutes, seconds to the hundredth of a second). The site elevation must be based on North American Vertical Datum of 1988. The survey letter must certify accuracy of at least plus or minus 50 feet for horizontal and 20 feet for vertical data.

See attachment for additional information.

If data is changed as a result of FAA verification, it will be necessary for you to ensure the corrected information is also on file with the FCC (if applicable).

NOTE: IF NO RESPONSE IS RECEIVED WITHIN 30 DAYS OF THE DATE OF THIS LETTER, ACTION WILL BE TAKEN TO TERMINATE THIS AERONAUTICAL STUDY.

If we can be of further assistance, please contact our office at (310) 725-6557. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2015-AWP-7003-OE.

Signature Control No: 256374597-258091911 (ADD)
Karen McDonald
Specialist

Attachment(s)
Additional Information
Case Description
Map(s)

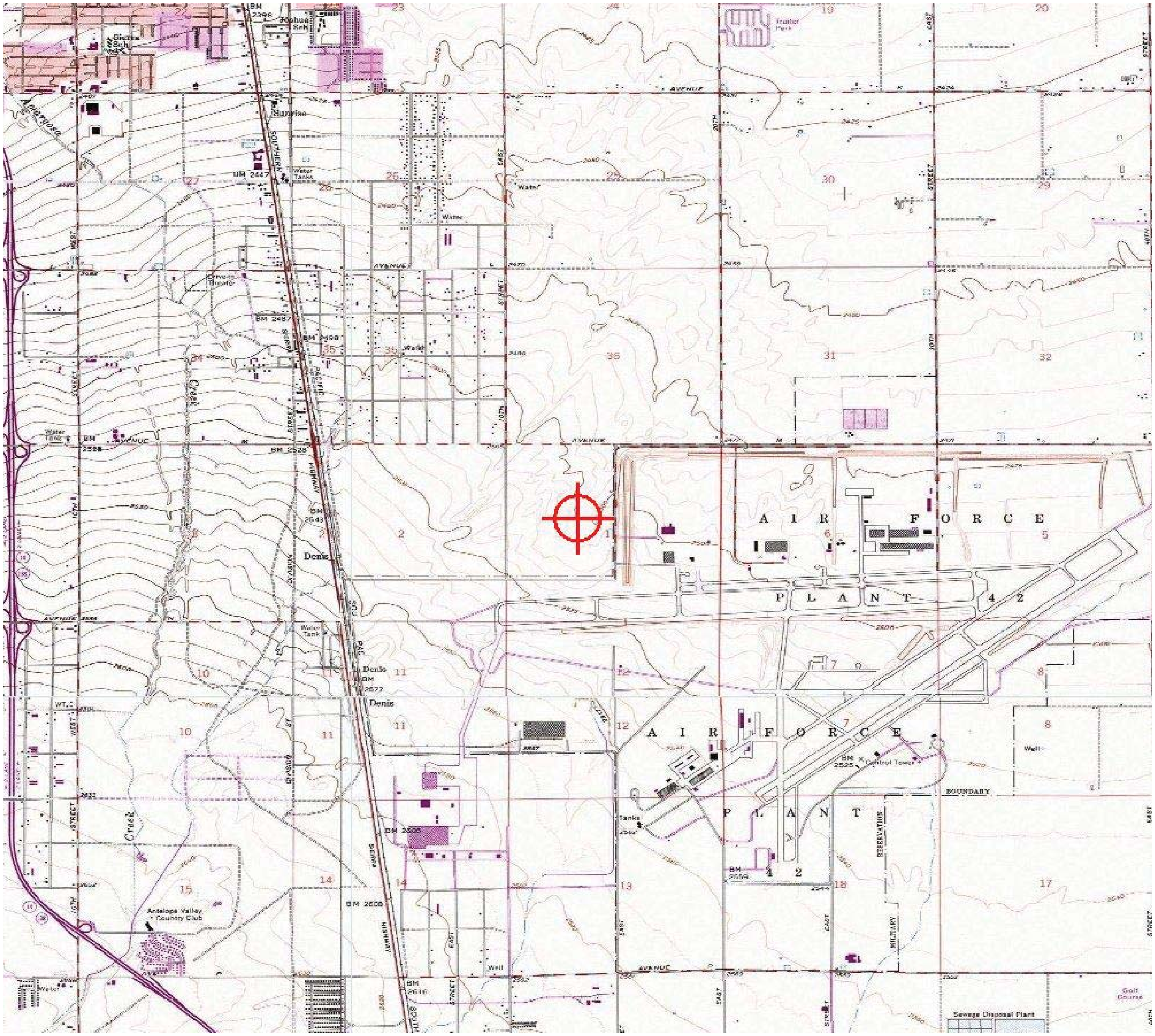
Additional information for ASN 2015-AWP-7003-OE

At 2751 AMSL Palmdale RGNL/USAF Plant 42 (PMD) Palmdale, CA. RNAV (GPS) RWY 25 Increase Cats A/B/C/D circling MDA from 3000/3000/3000/3100 to 3120, NEH 2698 AMSL, W/2C increase cats A/B/C circling MDA from 3000/3000/3000 to 3060, NEH 2700 AMSL./// ILS OR LOC RWY 25 increase SKKEE FIX MINIMUMS (DUAL VOR RECEIVERS OR DME REQUIRED) Cats A/B/C/D circling MDA from 3000/3000/3000/3100 to 3120, NEH 2698 AMSL, W/2C increase cats A/B/C circling MDA from 3000/3000/3000 to 3060, NEH 2700 AMSL./// VOR/DME OR TACAN RWY 25 increase Cats A/B/C/D/E circling MDA from 3000/3000/3000/3100/3100 to 3120, NEH 2698 AMSL, w/2C increase cats A/B/C circling MDA from 3000/3000/3000 to 3060, NEH 2700 AMSL.///HI-TACAN RWY 25 Increase Cats C/D/E circling MDA from 3000/3100/3100 to 3120, NEH 2698 AMSL, W/2C increase cats C circling MDA from 3000 to 3060, NEH 2700 AMSL

Case Description for ASN 2015-AWP-7003-OE

The Heat Recovery Steam Generator Erection Crane will be used to erect the two Palmdale Energy Center HRSGs and may be used for erection of other project structures. The crane coordinates are the point midway between the two HRSG stack centers. The crane will be a Manitowoc 2250 or similar.

TOPO Map for ASN 2015-AWP-7003-OE



APPENDIX 6-F
PLUME VERTICAL VELOCITY ASSESSMENT

Plume Vertical Velocity Assessment
For the Palmdale Energy Project

Prepared for

Palmdale Energy, LLC

SUMMIT
POWER

Prepared By

ATMOSPHERIC DYNAMICS, INC
Meteorological & Air Quality Modeling

Atmospheric Dynamics, Inc.
Carmel-by-the-Sea, CA. 93921

June 2015

Introduction

Palmdale Energy, LLC is proposing to develop the Palmdale Energy Project (PEP), located near the Palmdale Airport. The combined-cycle project will utilize two (2) Siemens SCC6-5000F natural gas-fired combustion turbine generators (CTG) and two (2) heat recovery steam generators (HRSG) with supplemental duct firing. The PEP site will be located on an approximately 50-acre undeveloped parcel west of the northwest corner of U.S. Air Force Plant 42. An analysis of the plume characteristics was prepared based on the vertical plume-averaged velocities as described below.

Vertical plume velocity guidelines

Atmospheric Dynamics, Inc. (ADI) has prepared plume vertical velocity assessments for the two (2) combined-cycle gas-fired turbines. The assessments presented in this report are based on the Spillane methodology outlined in the *"Aviation Safety and Buoyant Plumes"* paper (Peter Best, et. al., presented at the Clean Air Conference, Newcastle, New South Wales, Australia, 2003). This methodology is also recognized for aviation safety set out by the Australian Civil Aviation Safety Authority (CASA) and presented in *"Guidelines for conducting plume rise assessments (CASA, 2004)".*

The aim of this assessment is to conservatively determine the potential for turbulence generated by the projects exhaust plumes. The method uses absolute worst-case assumptions of calm winds and neutral atmospheric conditions for the entire vertical extent of the plume to determine these worst-case impacts. It should be noted that these results are extremely conservative in that these worst-case conditions typically only occur during a few hours each year.

The Australian Civil Aviation Safety Authority (CASA) has taken an active role in the review of the siting of facilities with the potential to affect aviation activities since the mid-1990s. Potential hazards that could potentially affect the safety of aircraft include tall visible or invisible obstructions. Visible obstructions include structures such as tall stacks or communication towers. Invisible obstructions include industrial exhausts that generate significant turbulence due to high velocity and buoyancy, such as simple-cycle gas turbines. CASA has issued an Advisory Circular, (CASA 2004) that specifies the requirements and methodologies to be used to assess whether a new industrial plume is likely to have adverse implications for aviation safety.

The general CASA requirement is to determine the height at which the in plume (or plumes) could generate atmospheric turbulence and to determine the dimensions of the plume in these circumstances. The frequency of in-plume vertical velocities at the lowest height an aircraft may travel over the site, and at other heights are also required. For large plumes that are remote from airports, CASA requires an assessment that determines the size of a hazard zone to alert pilots to the potential hazard. Normally this analysis uses a sophisticated air dispersion model that determines plume vertical velocities and lateral/vertical extents based on wind fields generated from actual meteorological data. Rather than use such a refined technique, a conservative screening analysis based on calm wind field assumptions was used for this project.

For this report, the plume- averaged vertical velocities were calculated as a function of height under calm conditions. While there are some sections of the plume that may have a vertical velocity higher than the plume-averaged vertical velocity, it has been CASA's experience that these peak vertical velocities do not assess aviation safety risk appropriately. Past discussions between Katestone Environmental, who have used the vertical plume Spillane methodology in this study, and CASA have concluded that analysis of the average plume height and downwind distance is appropriate for these assessments (i.e., the use of plume-averaged vertical velocities is recommended by CASA).

Methodology – Calm Wind Scenario

The Spillane methodology is based on worst-case calm wind neutral conditions to assess the average plume vertical velocity as a function of height and the enhanced methodology described next has been used as a conservative methodology throughout Australia in the past. The methodology is based on well-verified laboratory and theoretical treatments of the rise and spread of a buoyant jet, both into a still ambient environment and into a light crosswind. This treatment covers in detail the initial dynamics of the plume as it exits the stack and the entrainment of ambient air into the plume as it rises directly above the stack. In addition to providing clarifications and algebraic solutions to the Spillane methodology, the 2003 paper provides additional methodologies that also consider the enhancement of vertical velocities that may occur if the plumes from multiple identical stacks merge and form a higher buoyancy combined plume (referred to here as the enhanced Spillane methodology).

The vertical plume assessment will involve several stages of development. For individual plumes, the stages are:

(a) In the first stage very close to the stack exit, the high plume momentum will result in a short section in which the conditions at the center of the plume are relatively unaffected by ambient and plume buoyancy conditions. This jet phase extends from the stack exit to approximately a distance of 6.25 D above the stack (where D is the stack diameter) in calm conditions. At the end of this stage, the plume-averaged vertical velocity has decreased to half of the stack exit velocity, with a corresponding increase, or doubling, in effective plume diameter.

(b) In the second stage, the plume responds to differences between ambient and plume buoyancy conditions, with much cooler and less turbulent ambient air being entrained into the plume from the outside regions of the plume towards the plume centerline. The momentum and buoyancy of the plume significantly influences plume rise and subsequently the dilution of the stack exhaust to decrease plume vertical velocities. This dilution is very sensitive to ambient wind speed, so the calm wind conditions considered here are extremely conservative.

(c) In the third stage of plume development, plume rise is due entirely to the buoyancy of the plume and continues from some distance until there is an equalization of turbulence conditions within and outside the plume. This final rise is often only achieved at considerable heights/distances from the stack where the effective average vertical velocity is then close to zero. Since there is very little turbulence and near-zero vertical velocities, this stage of plume development is usually not considered for this type of analysis.

In the second stage of development, the analytical solution of the governing equations under these conditions is given by:

$$a = 0.16(z - z_v)$$

$$V = \{ (Va)_o^{\,3} + 0.12F_o [(z - z_v)^2 - (6.25D - z_v)^2] \}^{1/3} / a$$

Where the subscript ‘o’ refers to values of the parameters at the stack outlet and the variables are:

a	plume radius (m)
V	average vertical velocity (m/s)
z	height above stack top (m)
z_v	virtual source height (m)
D	stack diameter (m)
F_o	buoyancy flux evaluated at the stack outlet (m^4s^{-3})

These are the two primary equations governing the growth of a single plume in the second stage of development under neutral calm wind conditions. Additional equations governing the first stage of single plume development as well as the interaction of multiple plumes in the second stage of development are discussed in detail in the Best paper.

For multiple stacks in the enhanced Spillane methodology, the equations governing the second stage are calculated from the point when the plumes begin to merge until they are fully merged. The plume merging begins at the height where the plume diameters equal the stack separations and the plumes are fully merged at the height where the plume diameters are equal to 2d(N-1)/2 for three or more stacks or 2d for two stacks. At the fully merged height, the merged plume diameter and velocity is enhanced by the fourth root of the number of stacks. Above the fully merged plume height, the enhanced plume diameter and plume velocities follow the regular equations given for the second stage. Below the fully merged plume height for the merging phase, plume velocities are linearly interpolated by height from the single plume velocity at the height where the plumes begin to merge to the enhanced plume velocity at the fully merged plume height.

Results

Vertical plume velocity assessments were made for the worst-case stack condition (100% load with duct burner off and, if applicable, evaporative cooler on) for a range of ambient temperatures, calm winds and neutral conditions. These stack conditions used in the assessment are presented in Table 1. The turbine stack separation is 130 feet (center-to-center).

Table 1 Stack Characteristics for Vertical Plume Velocity Analysis

Case No.	1	11	16	21
Ambient Temp (°F)	23	64	98	108
Stack Temp (°F)	195	195	208	213
Stack Height (ft)	160	160	160	160
Stack Diameter (ft)	22.0	22.0	22.0	22.0
Volumetric Flow (ACFM)	1,337,241	1,334,691	1,347,870	1,344,061
Stack Exit Velocity (m/s)	17.87	17.84	18.00	17.96
Stack Buoyancy Flux (m^4/s^3)	517.8	393.7	327.0	309.2

As can be seen, all the stack characteristics for the four ambient temperatures are similar (stack exit velocity or volumetric flow and stack exit temperature). However, these similar stack characteristics produce a very much larger buoyancy flux at the near minimum site temperature of 23°F that the buoyancy fluxes for annual average (64°F) and maximum site temperatures (98°F and 108°F). These stack characteristics were used to determine the vertical plume velocities for several reference heights or elevations above ground level (agl) and are presented in Table 2.

Table 2 Vertical Plume Velocity Analysis Results for Reference Heights

Case No.	1	11	16	21
Ambient Temp (°F)	23	64	98	108
Single Plume Results (m/s):				
at 500 feet-agl	5.54	5.17	4.97	4.91
at 1000 feet-agl	3.95	3.61	3.41	3.35
at 1500-feet agl	3.36	3.07	2.89	2.83
Merged-Plume Results (m/s)				
at 500 feet-agl	5.72	5.17	4.97	4.91
at 1000 feet-agl	4.70	4.30	4.06	3.99
at 1500-feet agl	4.09	3.75	3.54	3.48

As can be seen in the calculation summaries attached at the end of this document, vertical plume velocities are less than the CASA critical value of 4.3 m/s at both 1100 feet-agl and 1500 feet-agl for all ambient conditions for individual (single) plumes and also for most merged plumes except for the near minimum site temperature of 23°F. For the cold case, the condition which occur are less than 1% of the time each year, mostly under stable conditions. Also, the cases analyzed with the Spillane methodology also represent the worst-case conditions of calm winds at all levels of a neutral atmosphere, which also only occur for a few hours each year. Therefore, the frequency of a 4.3 m/s plume at altitudes above 1000 feet-agl would be extremely rare (based on calm winds at all levels of a neutral atmosphere with 23°F ambient temperatures).

Table 3 displays the heights at which the plume vertical velocities of 4.3 m/s occur for each case.

Table 3 Heights of 4.3 m/s Vertical Plume Velocity

Case No.	1	11	16	21
Ambient Temp (°F)	23	64	98	108
Single Plume 4.3 m/s Height (feet-agl)	820	686	625	610
Merged Plume 4.3 m/s Height (feet-agl)	1,296	1,001	776	714

As before, only the 23°F ambient temperature case shows plume vertical velocities greater than 4.3 m/s at 1100 feet-agl, and only under the enhanced merged plume scenario.

The results indicate that for all but one temperature case, the turbulence levels always remain in the light turbulence category. For the one ambient temperature case at 23°F, the vertical velocity is at the transition level between light and moderate turbulence at an altitude of 1296 feet-agl.

In reality, even light wind speeds can dramatically decrease the predicted plume-averaged vertical velocities so the above results are very conservative indications of adverse conditions. The important factor for a given location is the appropriateness of available information for estimating true wind and temperature profiles throughout a typical year. Theoretical calculations, as shown in the tables above, are likely to overestimate the expected vertical velocities, for the following reasons:

- The wind profile is assumed constant with height with no occurrence of wind-shear. In reality, there is a considerable variation with height, especially in light winds;
- Worst-case scenarios are based on very light-wind, near-neutral atmospheric conditions with maximum loading.

Attachments
Spillane Calculation Summary Sheets
Two Turbine Scenario for 23, 64, 98, and 108^{o}F

MERGED Plume Average Vertical Velocities for Two Combined-Cycle Turbines at Palmdale, CA - 23F Case 1

"*Aviation Safety and Buoyant Plumes*," Peter Best, et. al.

"*The Evaluation of Maximum Updraft Speeds for Calm Conditions at Various Heights in the Merged Plume from Two Gas-Turbine Power Station at Oakey, Queensland, Australia*," Dr. K.T. Spillane

Ambient Conditions:					**Constants:** Assume neutral conditions ($d\theta/dz=0$ or $\theta_a=\theta_e$)	
Ambient Potential Temp θ_a	268.15	Kelvins	23.0	°F	0.3048 meters/feet	
Plume Exit Conditions:					Gravity g 9.81 m/s^2	
Stack Height h_s	48.77	meters	160.0	feet	λ 1.11	
Stack Diameter D	6.7056	meters	22.00	feet	λ_o ~1.0	
Number of Stacks N	2				**Base calcs on multiple plume treatment in Peter Best Paper**	
Stack Separation d	39.62	meters	130.0	feet	**plume velocities/diameters increased by $N^{0.25}$**	
Stack Velocity V_{exit}	17.87	m/s	58.63	ft/sec		
Volumetric Flow	631.09	cu.m/sec	1,337,231	ACFM	$\pi V_{exit}D^2/4$	Sect.2/¶1
Stack Potential Temp θ_s	363.71	Kelvins	195	°F		
Initial Stack Buoyancy Flux F_o	517.76	m4/s3			$gV_{exit}D^2(1-\theta_a/\theta_s)/4$ = Vol.Flow$(g/\pi)(1-\theta_a/\theta_s)$	Sect.2/¶1
Plume Buoyancy Flux F	N/A	m4/s3			$\lambda^2 gVa^2(1-\theta_a/\theta_p)$ for a,V,θ_p at plume height (see below)	
Conditions at End (Top) of Jet Phase:						
Height above Stack z_{jet}	41.910	meters*	137.5	feet*	$z_{jet} = 6.25D$, meters*=meters above stack top	Sect.3/¶1
Height above Ground $z_{jet}+h_s$	90.680	meters	**297.5**	feet		"
Vertical Velocity V_{jet}	**8.935**	m/s	29.31	ft/sec	$V_{jet} = 0.5V_{exit} = V_{exit}/2$	"
Plume Top-Hat Diameter $2a_{jet}$	13.411	meters	44.0	feet	$2a_{jet} = 2D$ Conservation of momentum	"
Spillane Methodology - Analytical Solutions for Calm Conditions for Plume Heights above Jet and Merging Phases						
Single Plume-averaged Vertical Velocity V given by Analytical Solution in Paper where Product Va given by equations below:						
Single Plume Values: Plume Top-Hat Radius a	**Used in Plume Merging Only**				$a = 0.16(z-z_v)$, or linear increase with height	Sect.2/Eq.6
Virtual Source Height z_v	5.924	meters*	19.4	feet*	$z_v = 6.25D[1-(\theta_e/\theta_s)^{1/2}]$, meters*=meters above stack top	Sect.2/Eq.6
Height above Ground z_v+h_s	54.694	meters	179.4	feet	where $(\theta_a/\theta_s)^{1/2} = (\theta_e/\theta_s)^{1/2}$=	0.8586
Single Plume Values: Vertical Velocity V	**Used in Plume Merging Only**				$\{(Va)_o^3 + 0.12F_o [(z-z_v)^2 - (6.25D-z_v)^2]\}^{(1/3)} / a$	Sect.2.1(6)
Product $(Va)_o$	51.445	m^2/s			$V_{exit}(D/2)(\theta_e/\theta_s)^{1/2}$	
Plume Merging - Based on Single Plume Calculations where:						Sect.3/¶3
Begin Merging Plume Top-Hat Diameter $2a_{touch}$	39.624	meters	130.0	feet	$2a_{touch}=d$, (or $a_{touch}=d/2$)	
Height above Stack z_{touch}	129.749	meters*	425.7	feet*	$z_{touch} = z_v+d/(2*0.16)$, meters*=meters above stack top	
Height above Ground $z_{touch}+h_s$	178.519	meters	**585.7**	feet		
Vertical Velocity V_{touch}	**5.061**	m/s	16.6	ft/sec	$V_{touch} = \{(Va)_o^3 + 0.12F_o [(z-z_v)^2 - (6.25D-z_v)^2]\}^{(1/3)} / a$	
Total Merging Plume Top-Hat **Diameter** $2a_{full}$	79.248	meters	260.0	feet	$2a_{full}=2d(N-1)/2$, (or $a_{full}=d(N-1)/2$) **FOR 2 STACKS, $2a_{full}=2d$**	
Height above Stack z_{full}	253.574	meters*	831.9	feet*	$z_{full} = z_v+2d/(2*0.16)$, meters*=meters above stack top	
Height above Ground $z_{full}+h_s$	302.344	meters	**991.9**	feet		
Vertical Velocity V_{full}	3.961	m/s	13.0	ft/sec	$V_{full} = \{(Va)_o^3 + 0.12F_o [(z_{full}-z_v)^2 - (6.25D-z_v)^2]\}^{(1/3)} / a_{full}$	
Product $(V^3a)_{full}$	2,462	m^4/s^3				
Conditions at End (Top) of Merging Phase - Define new values for V_{full} and a_{full} in Merged Plume calculations:						
Merged Plume Values: Plume Diameter 2a	**Solutions in Table Below**				$2a = 2 \times (a_m + 0.16(z-z_{full}))$, or linear increase with height	
Revised Merged Plume **Radius** a_m	47.121	meters	154.6	feet	where $a_m = N^{0.25}a_{full}$ where Total Merging Occurs	
Revised Merged Plume Velocity V_m	**4.710**	m/s	15.45	ft/sec	and $V_m = N^{0.25}V_{full}$ where Total Merging Occurs	
Revised Virtual Source Height z_{full}	253.574	meters*	831.9	feet*	Height above stack where Total Merging Occurs (shown above)	
Revised Vertical Velocity V	**Solutions in Tables Below**				$V=\{N(V^3a)_{full}/a\}^{1/3}$ for heights above total merging elevation	
					$V=V_{touch}+(V_m-V_{touch})*(z-z_{touch})/(z_{full}-z_{touch})$	
Multiple Plume Calculations					for heights below total merging elevation	
Solve for plume-averaged vertical velocity at height	**1,000.0**	**feet**	304.8		meters above ground $(z+h_s)$	
Gives the following Height above Stack z	256.030	meters*	840.0	feet*	REGULAR EQNS	
Plume Top-Hat Radius a	47.514	meters	155.9	feet	$a=a_m+0.16(z-z_{full})$ **if $z>z_{full}$**	
Vertical Velocity V	**4.697**	**m/s**	15.41	ft/sec	$V=\{N(V^3a)_{full}/a\}^{1/3}$ **if $z>z_{full}$**	
					$V'=V_{touch}+(V_m-V_{touch})*(z'-z_{touch})/(z_{full}-z_{touch})$ **if $z_{touch}<z<z_{full}$**	
					V'=single plume values **if $z<z_{touch}$**	
Solve for Height of CASC critical vertical velocity V_{crit}	**4.30**	**m/s**			REGULAR EQNS	
Find Height above Stack z_{crit}	346.216	meters	1135.9	feet	$z_{crit} = z_{full} + \{[N(V^3a)_{full}/(V_{crit})^3]-a_m\}/0.16$ **if $V_{crit}<V_m$**	
Height above Ground $z_{crit}+h_s$	394.986	meters	**1295.9**	**feet**	$z_{crit}=z_{touch}+(z_{full}-z_{touch})*(V_{crit}-V_{touch})/(V_m-V_{touch})$ **if $V_{crit}>V_m$**	

Table of Plume-averaged Vertical Velocities:

Height (feet) above ground	**(meters) above stack**	**Plume Radius(m)**	**Vert. Vel(m/s)**	
Top of jet = 297.5	***41.91***	***6.706***	***8.94***	*Single Plume Eqns*
300.0	42.67	5.879	8.82	$V_{plume}=\{(Va)_o^3+0.12F_o[(z-z_v)^2-(6.25D-z_v)^2]\}^{1/3} / a$
400.0	73.15	10.756	6.47	$a = 0.16(z-z_v)$
Brigg's Grad.PR 4.3m/s Height = 474.5	95.86	14.389	5.72	$\theta_p=\theta_s(1+(1-(\theta_e/\theta_s))*(V_{exit}D^2/(4V_{plume}*a^2*\lambda^2)))$
500.0	103.63	15.633	5.54	
Begin Merging (touch) = 585.7	***129.75***	***19.812***	***5.06***	*Interpolated Layer Eqns*
600.0	134.11	#N/A	5.05	$V'=V_{touch}+(V_m-V_{touch})*(z'-z_{touch})/(z_{full}-z_{touch})$
700.0	164.59	#N/A	4.96	
800.0	195.07	#N/A	4.88	
900.0	225.55	#N/A	4.79	
End Merging (full/mp) = 991.9	***253.56***	***47.121***	***4.71***	*Merged Plume Eqns*
1000.0	256.03	47.514	4.70	$V=\{N(V^3a)_{full}/a\}^{1/3}$
1100.0	286.51	52.391	4.55	$a=a_m+0.16(z-z_{full})$
1200.0	316.99	57.268	4.41	
CEC 4.3m/s Height = 1221.1	323.42	58.297	4.39	
1300.0	347.47	62.144	4.30	
1400.0	377.95	67.021	4.19	
1500.0	408.43	71.898	4.09	
1600.0	438.91	76.775	4.00	
1800.0	499.87	86.528	3.85	
2000.0	560.83	96.282	3.71	
2200.0	621.79	106.036	3.59	
2400.0	682.75	115.789	3.49	
2600.0	743.71	125.543	3.40	
2800.0	804.67	135.296	3.31	
3000.0	865.63	145.050	3.24	

MERGED Plume Average Vertical Velocities for Two Combined-Cycle Turbines at Palmdale, CA - 64F Case 11

"*Aviation Safety and Buoyant Plumes*," Peter Best, et. al.

"*The Evaluation of Maximum Updraft Speeds for Calm Conditions at Various Heights in the Merged Plume from Two Gas-Turbine Power Station at Oakey, Queensland, Australia*," Dr. K.T. Spillane

Ambient Conditions:					**Constants:** Assume neutral conditions ($d\theta/dz=0$ or $\theta_a=\theta_e$)	
Ambient Potential Temp θ_a	290.93	Kelvins	64.0	°F	0.3048 meters/feet	
Plume Exit Conditions:					Gravity g 9.81 m/s^2	
Stack Height h_s	48.77	meters	160.0	feet	λ 1.11	
Stack Diameter D	6.7056	meters	22.00	feet	λ_o ~1.0	
Number of Stacks N	2				**Base calcs on multiple plume treatment in Peter Best Paper**	
Stack Separation d	39.62	meters	130.0	feet	**plume velocities/diameters increased by $N^{0.25}$**	
Stack Velocity V_{exit}	17.84	m/s	58.53	ft/sec		
Volumetric Flow	630.03	cu.m/sec	1,334,950	ACFM	$\pi V_{exit}D^2/4$	Sect.2/¶1
Stack Potential Temp θ_s	363.71	Kelvins	195	°F		
Initial Stack Buoyancy Flux F_o	393.67	m4/s3			$gV_{exit}D^2(1-\theta_a/\theta_s)/4$ = Vol.Flow$(g/\pi)(1-\theta_a/\theta_s)$	Sect.2/¶1
Plume Buoyancy Flux F	N/A	m4/s3			$\lambda^2 gVa^2(1-\theta_a/\theta_p)$ for a,V,θ_p at plume height (see below)	
Conditions at End (Top) of Jet Phase:						
Height above Stack z_{jet}	41.910	meters*	137.5	feet*	$z_{jet} = 6.25D$, meters*=meters above stack top	Sect.3/¶1
Height above Ground $z_{jet}+h_s$	90.680	meters	**297.5**	feet		"
Vertical Velocity V_{jet}	**8.920**	m/s	29.27	ft/sec	$V_{jet} = 0.5V_{exit} = V_{exit}/2$	"
Plume Top-Hat Diameter $2a_{jet}$	13.411	meters	44.0	feet	$2a_{jet} = 2D$ — Conservation of momentum	"
Spillane Methodology - Analytical Solutions for Calm Conditions for Plume Heights above Jet and Merging Phases						
Single Plume-averaged Vertical Velocity V given by Analytical Solution in Paper where Product Va given by equations below:						
Single Plume Values: Plume Top-Hat Radius a	**Used in Plume Merging Only**				$a = 0.16(z-z_v)$, or linear increase with height	Sect.2/Eq.6
Virtual Source Height z_v	4.427	meters*	14.5	feet*	$z_v = 6.25D[1-(\theta_e/\theta_s)^{1/2}]$, meters*=meters above stack top	Sect.2/Eq.6
Height above Ground z_v+h_s	53.197	meters	174.5	feet	where $(\theta_a/\theta_s)^{1/2} = (\theta_e/\theta_s)^{1/2}=$	0.8944
Single Plume Values: Vertical Velocity V	**Used in Plume Merging Only**				$\{(Va)_o^3 + 0.12F_o[(z-z_v)^2 - (6.25D-z_v)^2]\}^{(1/3)} / a$	Sect.2.1(6)
Product $(Va)_o$	53.496	m^2/s			$V_{exit}(D/2)(\theta_e/\theta_s)^{1/2}$	
Plume Merging - Based on Single Plume Calculations where:						Sect.3/¶3
Begin Merging Plume Top-Hat Diameter $2a_{touch}$	39.624	meters	130.0	feet	$2a_{touch}=d$, (or $a_{touch}=d/2$)	
Height above Stack z_{touch}	128.252	meters*	420.8	feet*	$z_{touch} = z_v+d/(2*0.16)$, meters*=meters above stack top	
Height above Ground $z_{touch}+h_s$	177.022	meters	**580.8**	feet		
Vertical Velocity V_{touch}	**4.707**	m/s	15.4	ft/sec	$V_{touch} = \{(Va)_o^3 + 0.12F_o[(z-z_v)^2 - (6.25D-z_v)^2]\}^{(1/3)} / a$	
Total Merging Plume Top-Hat **Diameter** $2a_{full}$	**79.248**	meters	260.0	feet	$2a_{full}=2d(N-1)/2$, (or $a_{full}=d(N-1)/2$) **FOR 2 STACKS, $2a_{full}=2d$**	
Height above Stack z_{full}	252.077	meters*	827.0	feet*	$z_{full} = z_v+2d/(2*0.16)$, meters*=meters above stack top	
Height above Ground $z_{full}+h_s$	300.847	meters	**987.0**	feet		
Vertical Velocity V_{full}	3.633	m/s	11.9	ft/sec	$V_{full} = \{(Va)_o^3 + 0.12F_o[(z_{full}-z_v)^2 - (6.25D-z_v)^2]\}^{(1/3)} / a_{full}$	
Product $(V^3a)_{full}$	1,901	m^4/s^3				
Conditions at End (Top) of Merging Phase - Define new values for V_{full} and a_{full} in Merged Plume calculations:						
Merged Plume Values: Plume Diameter 2a	**Solutions in Table Below**				$2a = 2 \times (a_m + 0.16(z-z_{full}))$, or linear increase with height	
Revised Merged Plume **Radius** a_m	47.121	meters	154.6	feet	where $a_m = N^{0.25}a_{full}$ where Total Merging Occurs	
Revised Merged Plume Velocity V_m	**4.321**	m/s	14.18	ft/sec	and $V_m = N^{0.25}V_{full}$ where Total Merging Occurs	
Revised Virtual Source Height z_{full}	252.077	meters*	827.0	feet*	Height above stack where Total Merging Occurs (shown above)	
Revised Vertical Velocity V	**Solutions in Tables Below**				$V=\{N(V^3a)_{full}/a\}^{1/3}$ for heights above total merging elevation	
					$V=V_{touch}+(V_m-V_{touch})*(z-z_{touch})/(z_{full}-z_{touch})$	
Multiple Plume Calculations					for heights below total merging elevation	
Solve for plume-averaged vertical velocity at height	**1,000.0**	**feet**	304.8		meters above ground ($z+h_s$)	
Gives the following Height above Stack z	256.030	meters*	840.0	feet*	REGULAR EQNS	
Plume Top-Hat Radius a	47.754	meters	156.7	feet	$a=a_m+0.16(z-z_{full})$ **if $z>z_{full}$**	
Vertical Velocity V	**4.302**	**m/s**	14.11	ft/sec	$V=\{N(V^3a)_{full}/a\}^{1/3}$ **if $z>z_{full}$**	
					$V'=V_{touch}+(V_m-V_{touch})*(z'-z_{touch})/(z_{full}-z_{touch})$ **if $z_{touch}<z<z_{full}$**	
					V'=single plume values **if $z<z_{touch}$**	
Solve for Height of CASC critical vertical velocity V_{crit}	**4.30**	**m/s**			REGULAR EQNS	
Find Height above Stack z_{crit}	256.377	meters	841.1	feet	$z_{crit} = z_{full} + \{[N(V^3a)_{full}/(V_{crit})^3]-a_m\}/0.16$ **if $V_{crit}<V_m$**	
Height above Ground $z_{crit}+h_s$	305.147	meters	**1001.1**	**feet**	$z_{crit}=z_{touch}+(z_{full}-z_{touch})*(V_{crit}-V_{touch})/(V_m-V_{touch})$ **if $V_{crit}>V_m$**	

Table of Plume-averaged Vertical Velocities:

Height (feet) above ground	**(meters) above stack**	**Plume Radius(m)**	**Vert. Vel(m/s)**	
Top of jet = 297.5	***41.91***	***6.706***	***8.92***	*Single Plume Eqns*
300.0	42.67	6.119	8.79	$V_{plume}=\{(Va)_o^3+0.12F_o[(z-z_v)^2-(6.25D-z_v)^2]\}^{1/3} / a$
Brigg's Grad.PR 4.3m/s Height = 394.3	71.41	10.718	6.24	$a = 0.16(z-z_v)$
400.0	73.15	10.996	6.15	$\theta_p=\theta_s(1+(1-(\theta_e/\theta_s))*(V_{exit}D^2/(4V_{plume}*a^2*\lambda^2)))$
500.0	103.63	15.872	5.17	
Begin Merging (touch) = 580.8	***128.26***	***19.812***	***4.71***	*Interpolated Layer Eqns*
600.0	134.11	#N/A	4.69	$V'=V_{touch}+(V_m-V_{touch})*(z'-z_{touch})/(z_{full}-z_{touch})$
700.0	164.59	#N/A	4.59	
800.0	195.07	#N/A	4.50	
900.0	225.55	#N/A	4.40	
End Merging (full/mp) = 987.0	***252.07***	***47.121***	***4.32***	*Merged Plume Eqns*
CEC 4.3m/s Height = 978.2	249.39	46.690	4.33	$V=\{N(V^3a)_{full}/a\}^{1/3}$
1000.0	256.03	47.754	4.30	$a=a_m+0.16(z-z_{full})$
1100.0	286.51	52.630	4.16	
1200.0	316.99	57.507	4.04	
1300.0	347.47	62.384	3.94	
1400.0	377.95	67.261	3.84	
1500.0	408.43	72.138	3.75	
1600.0	438.91	77.014	3.67	
1800.0	499.87	86.768	3.53	
2000.0	560.83	96.522	3.40	
2200.0	621.79	106.275	3.29	
2400.0	682.75	116.029	3.20	
2600.0	743.71	125.782	3.11	
2800.0	804.67	135.536	3.04	
3000.0	865.63	145.290	2.97	

MERGED Plume Average Vertical Velocities for Two Combined-Cycle Turbines at Palmdale, CA - 98F Case 16

"*Aviation Safety and Buoyant Plumes*," Peter Best, et. al.

"*The Evaluation of Maximum Updraft Speeds for Calm Conditions at Various Heights in the Merged Plume from Two Gas-Turbine Power Station at Oakey, Queensland, Australia*," Dr. K.T. Spillane

Ambient Conditions:					**Constants:** Assume neutral conditions ($d\theta/dz=0$ or $\theta_a=\theta_e$)	
Ambient Potential Temp θ_a	309.82	Kelvins	98.0	°F	0.3048 meters/feet	
Plume Exit Conditions:					Gravity g 9.81 m/s^2	
Stack Height h_s	48.77	meters	160.0	feet	λ 1.11	
Stack Diameter D	6.7056	meters	22.00	feet	λ_o ~1.0	
Number of Stacks N	2				**Base calcs on multiple plume treatment in Peter Best Paper**	
Stack Separation d	39.62	meters	130.0	feet	**plume velocities/diameters increased by $N^{0.25}$**	
Stack Velocity V_{exit}	18	m/s	59.06	ft/sec		
Volumetric Flow	635.68	cu.m/sec	1,347,038	ACFM	$\pi V_{exit}D^2/4$	Sect.2/¶1
Stack Potential Temp θ_s	370.93	Kelvins	208	°F		
Initial Stack Buoyancy Flux F_o	327.02	m4/s3			$gV_{exit}D^2(1-\theta_a/\theta_s)/4$ = Vol.Flow$(g/\pi)(1-\theta_a/\theta_s)$	Sect.2/¶1
Plume Buoyancy Flux F	N/A	m4/s3			$\lambda^2 gVa^2(1-\theta_a/\theta_p)$ for a,V,θ_p at plume height (see below)	
Conditions at End (Top) of Jet Phase:						
Height above Stack z_{jet}	41.910	meters*	137.5	feet*	z_{jet} = 6.25D, meters*=meters above stack top	Sect.3/¶1
Height above Ground $z_{jet}+h_s$	90.680	meters	**297.5**	feet		"
Vertical Velocity V_{jet}	**9.000**	m/s	29.53	ft/sec	$V_{jet} = 0.5V_{exit} = V_{exit}/2$	"
Plume Top-Hat Diameter $2a_{jet}$	13.411	meters	44.0	feet	$2a_{jet}$ = 2D Conservation of momentum	"
Spillane Methodology - Analytical Solutions for Calm Conditions for Plume Heights above Jet and Merging Phases						
Single Plume-averaged Vertical Velocity V given by Analytical Solution in Paper where Product Va given by equations below:						
Single Plume Values: Plume Top-Hat Radius a	**Used in Plume Merging Only**				$a = 0.16(z-z_v)$, or linear increase with height	Sect.2/Eq.6
Virtual Source Height z_v	3.608	meters*	11.8	feet*	$z_v = 6.25D[1-(\theta_e/\theta_s)^{1/2}]$, meters*=meters above stack top	Sect.2/Eq.6
Height above Ground z_v+h_s	52.378	meters	171.8	feet	where $(\theta_a/\theta_s)^{1/2} = (\theta_e/\theta_s)^{1/2}$=	0.9139
Single Plume Values: Vertical Velocity V	**Used in Plume Merging Only**				$\{(Va)_o^3 + 0.12F_o [(z-z_v)^2 - (6.25D-z_v)^2]\}^{(1/3)}$ / a	Sect.2.1(6)
Product $(Va)_o$	55.156	m^2/s			$V_{exit}(D/2)(\theta_e/\theta_s)^{1/2}$	
Plume Merging - Based on Single Plume Calculations where:						Sect.3/¶3
Begin Merging Plume Top-Hat Diameter $2a_{touch}$	39.624	meters	130.0	feet	$2a_{touch}$=d, (or a_{touch}=d/2)	
Height above Stack z_{touch}	127.433	meters*	418.1	feet*	$z_{touch} = z_v$+d/(2*0.16), meters*=meters above stack top	
Height above Ground $z_{touch}+h_s$	176.203	meters	**578.1**	feet		
Vertical Velocity V_{touch}	**4.507**	m/s	14.8	ft/sec	$V_{touch} = \{(Va)_o^3 + 0.12F_o [(z-z_v)^2 - (6.25D-z_v)^2]\}^{(1/3)}$ / a	
Total Merging Plume Top-Hat **Diameter** $2a_{full}$	**79.248**	meters	260.0	feet	$2a_{full}$=2d(N-1)/2, (or a_{full}=d(N-1)/2) **FOR 2 STACKS, $2a_{full}$=2d**	
Height above Stack z_{full}	251.258	meters*	824.3	feet*	$z_{full} = z_v$+2d/(2*0.16), meters*=meters above stack top	
Height above Ground $z_{full}+h_s$	300.028	meters	**984.3**	feet		
Vertical Velocity V_{full}	3.433	m/s	11.3	ft/sec	$V_{full} = \{(Va)_o^3 + 0.12F_o [(z_{full}-z_v)^2 - (6.25D-z_v)^2]\}^{(1/3)} / a_{full}$	
Product $(V^3a)_{full}$	1,603	m^4/s^3				
Conditions at End (Top) of Merging Phase - Define new values for V_{full} and a_{full} in Merged Plume calculations:						
Merged Plume Values: Plume Diameter 2a	**Solutions in Table Below**				2a = 2 x (a_m + 0.16(z-z_{full})), or linear increase with height	
Revised Merged Plume **Radius** a_m	47.121	meters	154.6	feet	where $a_m = N^{0.25}a_{full}$ where Total Merging Occurs	
Revised Merged Plume Velocity V_m	**4.083**	m/s	13.39	ft/sec	and $V_m = N^{0.25}V_{full}$ where Total Merging Occurs	
Revised Virtual Source Height z_{full}	251.258	meters*	824.3	feet*	Height above stack where Total Merging Occurs (shown above)	
Revised Vertical Velocity V	**Solutions in Tables Below**				$V=\{N(V^3a)_{full}/a\}^{1/3}$ for heights above total merging elevation	
					$V=V_{touch}+(V_m-V_{touch})*(z-z_{touch})/(z_{full}-z_{touch})$	
Multiple Plume Calculations					for heights below total merging elevation	
Solve for plume-averaged vertical velocity at height	**1,000.0**	**feet**	304.8		meters above ground ($z+h_s$)	
Gives the following Height above Stack z	256.030	meters*	840.0	feet*	REGULAR EQNS	
Plume Top-Hat Radius a	47.885	meters	157.1	feet	$a=a_m+0.16(z-z_{full})$ **if $z>z_{full}$**	
Vertical Velocity V	**4.061**	**m/s**	13.32	ft/sec	$V=\{N(V^3a)_{full}/a\}^{1/3}$ **if $z>z_{full}$**	
					$V'=V_{touch}+(V_m-V_{touch})*(z'-z_{touch})/(z_{full}-z_{touch})$ **if $z_{touch}<z<z_{full}$**	
					V'=single plume values **if $z<z_{touch}$**	
Solve for Height of CASC critical vertical velocity V_{crit}	**4.30**	**m/s**			LESS THAN TOP OF MERGING PHASE-INTERPOLATE	
Find Height above Stack z_{crit}	187.804	meters	616.2	feet	$z_{crit} = z_{full} + \{[N(V^3a)_{full}/(V_{crit})^3]-a_m\}/0.16$ **if $V_{crit}<V_m$**	
Height above Ground $z_{crit}+h_s$	236.574	meters	**776.2**	**feet**	$z_{crit}=z_{touch}+(z_{full}-z_{touch})*(V_{crit}-V_{touch})/(V_m-V_{touch})$ **if $V_{crit}>V_m$**	

Table of Plume-averaged Vertical Velocities:

Height (feet) above ground	**(meters) above stack**	**Plume Radius(m)**	**Vert. Vel(m/s)**	
Top of jet = 297.5	***41.91***	***6.706***	***9.00***	*Single Plume Eqns*
300.0	42.67	6.250	8.87	$V_{plume}=\{(Va)_o^3+0.12F_o[(z-z_v)^2-(6.25D-z_v)^2]\}^{1/3}$ / a
Brigg's Grad.PR 4.3m/s Height = 351.3	58.31	8.752	6.98	$a = 0.16(z-z_v)$
400.0	73.15	11.127	6.02	$\theta_p=\theta_s(1+(1-(\theta_e/\theta_s))*(V_{exit}D^2/(4V_{plume}*a^2*\lambda^2)))$
500.0	103.63	16.004	4.97	
Begin Merging (touch) = 578.1	***127.43***	***19.812***	***4.51***	*Interpolated Layer Eqns*
600.0	134.11	#N/A	4.48	$V'=V_{touch}+(V_m-V_{touch})*(z'-z_{touch})/(z_{full}-z_{touch})$
700.0	164.59	#N/A	4.38	
800.0	195.07	#N/A	4.28	
CEC 4.3m/s Height = 857.1	212.47	#N/A	4.22	
900.0	225.55	#N/A	4.17	
End Merging (full/mp) = 984.3	***251.24***	***47.121***	***4.08***	*Merged Plume Eqns*
1000.0	256.03	47.885	4.06	$V=\{N(V^3a)_{full}/a\}^{1/3}$
1100.0	286.51	52.762	3.93	$a=a_m+0.16(z-z_{full})$
1200.0	316.99	57.638	3.82	
1300.0	347.47	62.515	3.72	
1400.0	377.95	67.392	3.62	
1500.0	408.43	72.269	3.54	
1600.0	438.91	77.146	3.46	
1800.0	499.87	86.899	3.33	
2000.0	560.83	96.653	3.21	
2200.0	621.79	106.406	3.11	
2400.0	682.75	116.160	3.02	
2600.0	743.71	125.914	2.94	
2800.0	804.67	135.667	2.87	
3000.0	865.63	145.421	2.80	

MERGED Plume Average Vertical Velocities for Two Combined-Cycle Turbines at Palmdale, CA - 108F Case 21								
	"***Aviation Safety and Buoyant Plumes***," **Peter Best, et. al.**							
	"***The Evaluation of Maximum Updraft Speeds for Calm Conditions at Various Heights in the Merged***							
		Plume from Two Gas-Turbine Power Station at Oakey, Queensland, Australia," **Dr. K.T. Spillane**						
Ambient Conditions:					**Constants:**	Assume neutral conditions ($d\theta/dz=0$ or $\theta_a=\theta_e$)		
Ambient Potential Temp θ_a	315.37	Kelvins	108.0	°F		0.3048	meters/feet	
Plume Exit Conditions:					Gravity g	9.81	m/s^2	
Stack Height h_s	48.77	meters	160.0	feet	λ	1.11		
Stack Diameter D	6.7056	meters	22.00	feet	λ_o	~1.0		
Number of Stacks N	2				**Base calcs on multiple plume treatment in Peter Best Paper**			
Stack Separation d	39.62	meters	130.0	feet		**plume velocities/diameters increased by $N^{0.25}$**		
Stack Velocity V_{exit}	17.96	m/s	58.92	ft/sec				
Volumetric Flow	634.27	cu.m/sec	1,343,845	ACFM	$\pi V_{exit}D^2/4$			Sect.2/¶1
Stack Potential Temp θ_s	373.71	Kelvins	213	°F				
Initial Stack Buoyancy Flux F_o	309.19	m4/s3			$gV_{exit}D^2(1-\theta_a/\theta_s)/4$ = Vol.Flow$(g/\pi)(1-\theta_a/\theta_s)$			Sect.2/¶1
Plume Buoyancy Flux F	N/A	m4/s3			$\lambda^2 gVa^2(1-\theta_a/\theta_p)$ for a,V,θ_p at plume height (see below)			
Conditions at End (Top) of Jet Phase:								
Height above Stack z_{jet}	41.910	meters*	137.5	feet*	z_{jet} = 6.25D, meters*=meters above stack top			Sect.3/¶1
Height above Ground $z_{jet}+h_s$	90.680	meters	**297.5**	feet				"
Vertical Velocity V_{jet}	**8.980**	m/s	29.46	ft/sec	$V_{jet} = 0.5V_{exit} = V_{exit}/2$			"
Plume Top-Hat Diameter $2a_{jet}$	13.411	meters	44.0	feet	$2a_{jet}$ = 2D		Conservation of momentum	"
Spillane Methodology - Analytical Solutions for Calm Conditions for Plume Heights above Jet and Merging Phases								
Single Plume-averaged Vertical Velocity V given by Analytical Solution in Paper where Product Va given by equations below:								
Single Plume Values: Plume Top-Hat Radius a	**Used in Plume Merging Only**				$a = 0.16(z-z_v)$, or linear increase with height			Sect.2/Eq.6
Virtual Source Height z_v	3.410	meters*	11.2	feet*	$z_v = 6.25D[1-(\theta_e/\theta_s)^{1/2}]$, meters*=meters above stack top			Sect.2/Eq.6
Height above Ground z_v+h_s	52.180	meters	171.2	feet			where $(\theta_a/\theta_s)^{1/2} = (\theta_e/\theta_s)^{1/2}$=	0.9186
Single Plume Values: Vertical Velocity V	**Used in Plume Merging Only**				$\{(Va)_o^3 + 0.12F_o [(z-z_v)^2 - (6.25D-z_v)^2]\}^{(1/3)} / a$			Sect.2.1(6)
Product $(Va)_o$	55.317	m^2/s			$V_{exit}(D/2)(\theta_e/\theta_s)^{1/2}$			
Plume Merging - Based on Single Plume Calculations where:								Sect.3/¶3
Begin Merging Plume Top-Hat Diameter $2a_{touch}$	39.624	meters	130.0	feet	$2a_{touch}$=d, (or a_{touch}=d/2)			
Height above Stack z_{touch}	127.235	meters*	417.4	feet*	$z_{touch} = z_v+d/(2*0.16)$, meters*=meters above stack top			
Height above Ground $z_{touch}+h_s$	176.005	meters	**577.4**	feet				
Vertical Velocity V_{touch}	**4.445**	m/s	14.6	ft/sec	$V_{touch} = \{(Va)_o^3 + 0.12F_o [(z-z_v)^2 - (6.25D-z_v)^2]\}^{(1/3)} / a$			
Total Merging Plume Top-Hat **Diameter** $2a_{full}$	**79.248**	meters	260.0	feet	$2a_{full}$=2d(N-1)/2, (or a_{full}=d(N-1)/2) **FOR 2 STACKS, $2a_{full}$=2d**			
Height above Stack z_{full}	251.060	meters*	823.7	feet*	$z_{full} = z_v+2d/(2*0.16)$, meters*=meters above stack top			
Height above Ground $z_{full}+h_s$	299.830	meters	**983.7**	feet				
Vertical Velocity V_{full}	3.374	m/s	11.1	ft/sec	$V_{full} = \{(Va)_o^3 + 0.12F_o [(z_{full}-z_v)^2 - (6.25D-z_v)^2]\}^{(1/3)} / a_{full}$			
Product $(V^3a)_{full}$	1,522	m^4/s^3						
Conditions at End (Top) of Merging Phase - Define new values for V_{full} and a_{full} in Merged Plume calculations:								
Merged Plume Values: Plume Diameter 2a	**Solutions in Table Below**				$2a = 2 \times (a_m + 0.16(z-z_{full}))$, or linear increase with height			
Revised Merged Plume **Radius** a_m	47.121	meters	154.6	feet	where $a_m = N^{0.25}a_{full}$ where Total Merging Occurs			
Revised Merged Plume Velocity V_m	**4.013**	m/s	13.16	ft/sec	and $V_m = N^{0.25}V_{full}$ where Total Merging Occurs			
Revised Virtual Source Height z_{full}	251.060	meters*	823.7	feet*	Height above stack where Total Merging Occurs (shown above)			
Revised Vertical Velocity V	**Solutions in Tables Below**				$V=\{N(V^3a)_{full}/a\}^{1/3}$ for heights above total merging elevation			
					$V=V_{touch}+(V_m-V_{touch})*(z-z_{touch})/(z_{full}-z_{touch})$			
Multiple Plume Calculations							for heights below total merging elevation	
Solve for plume-averaged vertical velocity at height		**1,000.0**	**feet**	304.8	meters above ground ($z+h_s$)			
Gives the following Height above Stack z	256.030	meters*	840.0	feet*	REGULAR EQNS			
Plume Top-Hat Radius a	47.916	meters	157.2	feet	$a=a_m+0.16(z-z_{full})$ **if $z>z_{full}$**			
Vertical Velocity V	**3.990**	**m/s**	13.09	ft/sec	$V=\{N(V^3a)_{full}/a\}^{1/3}$ **if $z>z_{full}$**			
					$V'=V_{touch}+(V_m-V_{touch})*(z'-z_{touch})/(z_{full}-z_{touch})$ **if $z_{touch}<z<z_{full}$**			
					V'=single plume values **if $z<z_{touch}$**			
Solve for Height of CASC critical vertical velocity V_{crit}		**4.30**	**m/s**		LESS THAN TOP OF MERGING PHASE-INTERPOLATE			
Find Height above Stack z_{crit}	168.829	meters	553.9	feet	$z_{crit} = z_{full} + \{[N(V^3a)_{full}/(V_{crit})^3]-a_m\}/0.16$ **if $V_{crit}<V_m$**			
Height above Ground $z_{crit}+h_s$	217.599	meters	**713.9**	**feet**	$z_{crit}=z_{touch}+(z_{full}-z_{touch})*(V_{crit}-V_{touch})/(V_m-V_{touch})$ **if $V_{crit}>V_m$**			
Table of Plume-averaged Vertical Velocities:								
Height (feet)	**(meters)**	**Plume**	**Vert.**					
above ground	**above stack**	**Radius(m)**	**Vel(m/s)**					
Top of jet = 297.5	***41.91***	***6.706***	***8.98***		*Single Plume Eqns*			
300.0	42.67	6.282	8.84		$V_{plume}=[(Va)_o^3+0.12F_o[(z-z_v)^2-(6.25D-z_v)^2]]^{1/3} / a$			
Brigg's Grad.PR 4.3m/s Height = 339.7	54.77	8.218	7.26		$a = 0.16(z-z_v)$			
400.0	73.15	11.158	5.96		$\theta_p=\theta_s(1+(1-(\theta_e/\theta_s))*(V_{exit}D^2/(4V_{plume}*a^2*\lambda^2)))$			
500.0	103.63	16.035	4.91					
Begin Merging (touch) = 577.4	***127.22***	***19.812***	***4.45***		*Interpolated Layer Eqns*			
600.0	134.11	#N/A	4.42		$V'=V_{touch}+(V_m-V_{touch})*(z'-z_{touch})/(z_{full}-z_{touch})$			
700.0	164.59	#N/A	4.31					
800.0	195.07	#N/A	4.21					
CEC 4.3m/s Height = 825.6	202.87	#N/A	4.18					
900.0	225.55	#N/A	4.10					
End Merging (full/mp) = 983.7	***251.06***	***47.121***	***4.01***		*Merged Plume Eqns*			
1000.0	256.03	47.916	3.99		$V=\{N(V^3a)_{full}/a\}^{1/3}$			
1100.0	286.51	52.793	3.86		$a=a_m+0.16(z-z_{full})$			
1200.0	316.99	57.670	3.75					
1300.0	347.47	62.547	3.65					
1400.0	377.95	67.424	3.56					
1500.0	408.43	72.300	3.48					
1600.0	438.91	77.177	3.40					
1800.0	499.87	86.931	3.27					
2000.0	560.83	96.684	3.16					
2200.0	621.79	106.438	3.06					
2400.0	682.75	116.192	2.97					
2600.0	743.71	125.945	2.89					
2800.0	804.67	135.699	2.82					
3000.0	865.63	145.452	2.76					

APPENDIX 6-G
TECHNICAL NOISE STUDY

ACENTECH

601 South Figueroa Street #4050
Los Angeles CA 90017
213 330 4237
acentech.com

June 16, 2015

Robert Gavahan, PE
Summit Power Group
801 2nd Avenue, Suite 1150
Seattle, WA 98104
Via email: rgavahan@summitpower.com

Subject Palmdale Power Plant – Technical Noise Study
Acentech Job No. P626192

Dear Mr. Gavahan:

Acentech Inc. (Acentech) is pleased to submit this technical report regarding the noise evaluation of the proposed Palmdale Energy Project in Palmdale, California (Project). The Project is on a 50 acre site located west of 15th Street E (private road to Plant 42) and between E Avenue M on the north and Palmdale Regional Airport to the south. The Project is within the CNEL 65 dB contour for the Air Force Plant 42/Palmdale Regional Airport.

The Project is a 700 MW combined cycle facility which includes two 232 MW gas turbine/generators and a 275 MW steam turbine generator. The Project does not include a solar component.

BACKGROUND

Acentech prepared a noise evaluation in the summer of 2008 for a proposed 570 MW hybrid power plant (PHPP) at the same site that included a conventional combined-cycle gas-fired power plant facility integrated with a 50 MW solar facility. As part of that evaluation Acentech performed ambient noise measurements at four locations described in Table 1. CEC Condition Noise-4 was based on the four quietest consecutive nighttime L(90) values shown in Table 1.[1]

Table 1 Noise Measurement Location Summary

Meas. Location	Description	Measured Nighttime L(90), dBA[2]
1	42104 6th St East. 628 feet North of Avenue M curb; 50 feet east of the center of 6th St and approximately 3,520 feet NW of the Project property line	38.9
2	Approximately 5,075 WSW of the Project property line and 85 feet east of rail line	39.3
3	Approximately 1,250 feet south of the Project, near the northern property line of the Palmdale Regional airport.	34.6
4	East side of site, within the Project property line. Approximately 2,440 feet south of E Avenue M; 32 feet west of Project property line and approximately 180 feet north of the southern Project property line.	34.7

[1] Section 5.8, Table 5.8-8.

PROJECT OPERATION EVALUATION

The CadnaA noise model software was used to calculate the noise levels. The acoustical model is a 3-dimensional model that considers the location of equipment items, equipment noise emission, uses standard hemispherical free-field propagation algorithms, noise reduction resulting from barriers and obstacles, reflections from major surfaces, and standard air and ground attenuation. The model can produce noise contours based upon a calculation grid (a 25 m by 25 m grid [82 feet by 82 feet] at a height of 1.5 m [5 feet] was used for all modeling).

The CadnaA model was used to model the noise levels from just the Project. Equipment locations (shown in Appendix C), equipment elevations, and equipment noise emissions in the form of A-weighted sound power levels (see Appendix A) were provided by Siemens Energy Inc. Equipment items were modeled as a point source, an area source, a line source or a vertical area source depending upon the size and shape of the equipment as indicated in Appendix A. Larger building and tanks were also identified in the model. The calculated noise contours for the Project are shown in Figure 1.

Table 2 provides a comparison of the Project to the PHPP and to the measured ambient noise levels for the four quietest hours of the night for the nearest noise sensitive property. The Project noise levels are less than 2 dB higher than the PHPP. The Project noise plus the ambient L(90) is 43.5 dBA. In accordance with CEC requirements, this does not represent a significant adverse noise impact since the ambient increase during the four quietest hours of the night is less than 5 dB and meets Condition of Certification Noise-4.

Table 2 Comparison of PHPP and Project Noise Levels to Nighttime Ambient Noise Levels

Name	Project Level Leq(1hr)	PHPP Leq(1hr)	Increase (Project – PHPP)	Nighttime Ambient L(90) [a)]	dB Above Ambient (Project – Ambient)
	(dBA)	(dBA)	(dB)	(dBA)	(dB)
Loc 1	41.7	40.2	1.5	38.9	2.8

Note a) Ambient L(90) averaged over the 4 quietest nighttime hours. The ambient L(90) averaged over the entire nighttime 9-hour period was 43.8 dBA.

The noise contribution to receiver at Location 1 from each noise source included in the model is listed in Appendix B.

If you have questions regarding the information provided in this transmittal, please call me at (805) 379-3449.

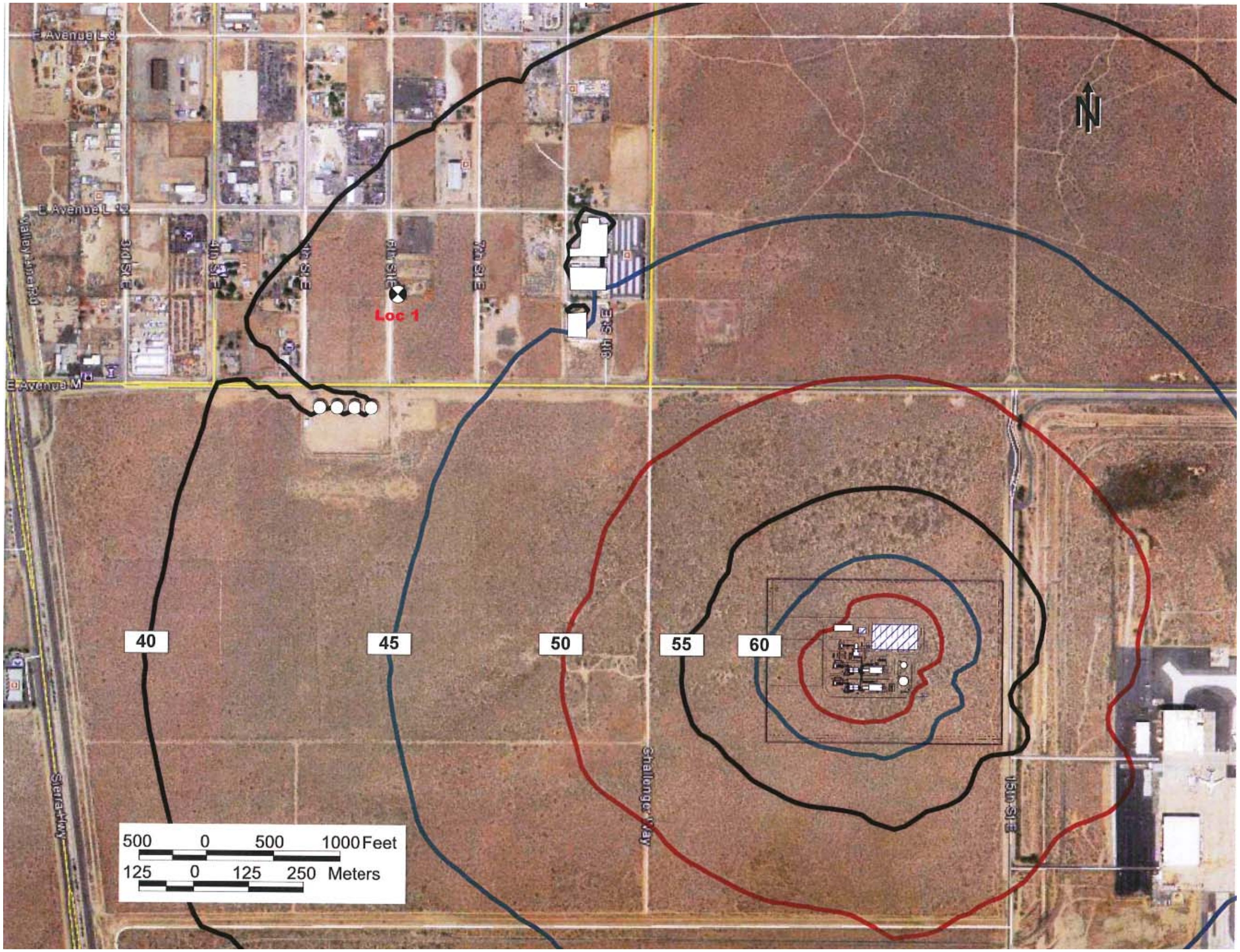
Sincerely,
ACENTECH INCORPORATED

Ramon E. Nugent

Ramon E. Nugent, PE
Principal Consultant

[2] L(90) is the A-weighted noise level that is exceeded 90% of the measurement period. L90 is often used to describe the quietness of the location.
dBA value is the sound pressure level in decibels as measured on a Sound Level Meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.

Figure 1 Operational Noise Contours for Project, Leq(1hr)



APPENDIX A

EQUIPMENT NOISE EMISSIONS

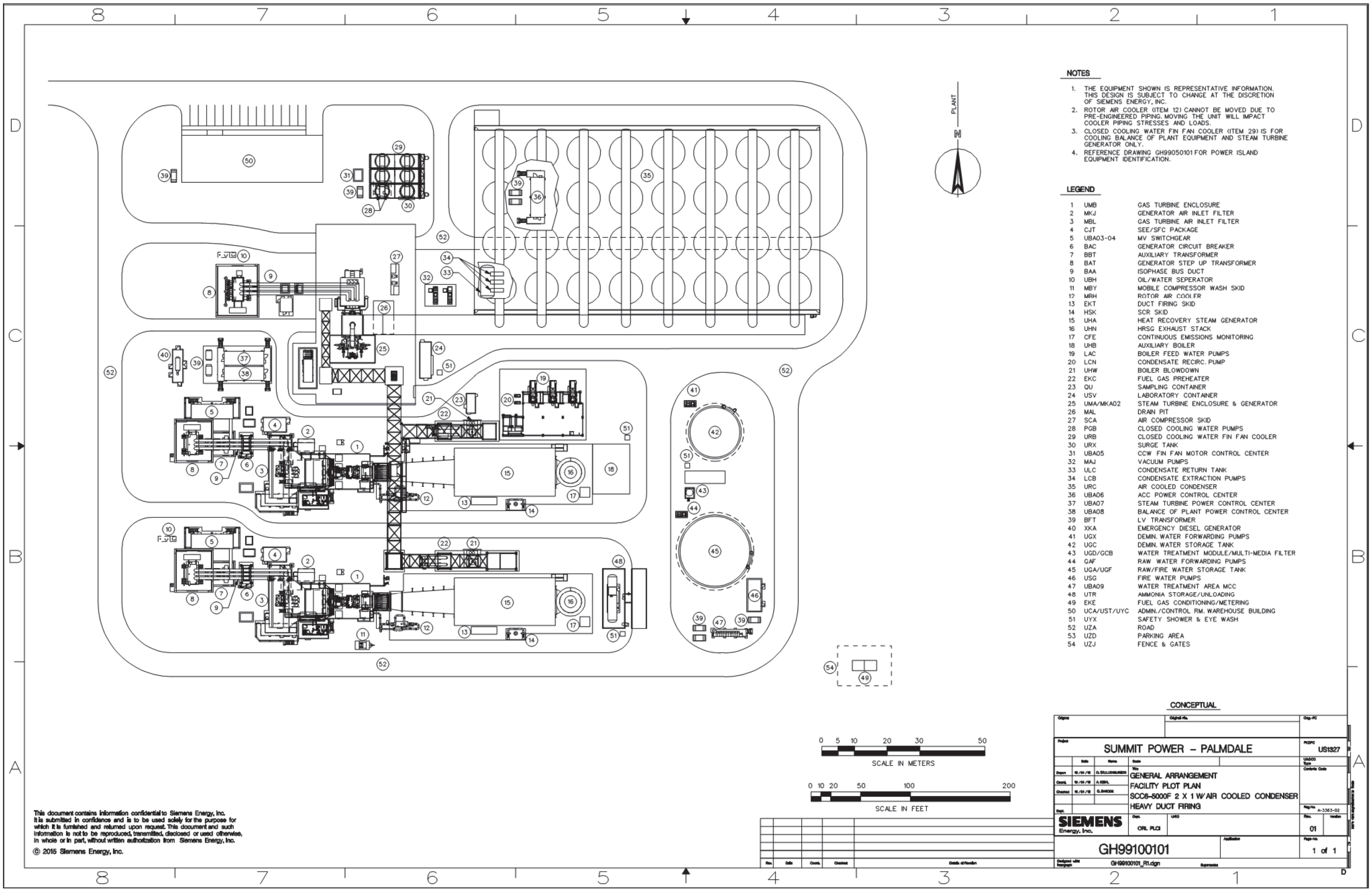
EQUIPMENT	SOUND POWER LEVEL, DBA
Point Sources	
Closed Cooling Water Pump	94.0
Fuel Gas	90.0
HRSG Exhaust	100.0
Turbine Enclosure vent	105.0
Vacuum Pump	94.0
Line Sources	
Air Cooled Condenser Pipes	103
Boiler Feedwater Pump	115
Condensate Extract Pump	104
Condensate Recirc Pump	104
Exhaust Diffuser	110
Kettle Boiler	103
Stack Break Out	96
Turbine Air Inlet Duct	104
Area Sources	
Air Cooled Condenser Top	111
Cooling Water Fin Fan Coolers	107
Gas Turbine Enclosure Top	91
Generator Enclosure Top	95
Steam Turbine Generator	95
Step up Transformer Top	108
Vertical Area Sources	
Bottom of Air Cooled Condenser	107
Gas Turbine Air Inlet	100
HRSG Inlet Duct Sides	109
HRSG Side	111
Gas Turbine Enclosure Sides	94
Generator Enclosure Sides	94
Steam Turbine Enclosure Sides	111
Steam Turbine Generator Enclosure Sides	95
Step up Transformer Sides	108
Gas Turbine Enclosure Ventilation	105
Gas Turbine Generator Enclosure	94

APPENDIX B

NOISE CONTRIBUTION TO LOCATION 1 RECEIVER

Source	Partial Level	Source	Partial Level
Boiler Feed Water Pump	31.1	Turbine Air Inlet Duct	21.7
Boiler Feed Water Pump	31.0	Condensate Extract Pump	21.6
Steam Turbine Encl Top	28.9	Turbine Air Inlet Duct	21.5
Air Cooled Condenser Top	28.4	HRSG Exhaust	21.2
Steam Turbines	28.4	HRSG Exhaust	21.0
Exhaust Diffuser	27.6	Turbine Encl Exhaust	20.8
Exhaust Diffuser	27.4	Turbine Encl Exhaust	20.6
Sides of HRSG	27.4	HRSG Inlet	19.1
Sides of HRSG	27.3	HRSG Inlet	18.6
Bottom of ACC	27.1	Kettle Boiler	17.5
HRSG Inlet side	26.6	Kettle Boiler	17.2
Step up Transformer Top	26.2	Condensate Recirc Pump	14.6
Step up Transformer Sides	26.2	Condensate Recirc Pump	14.6
Step up Transformer Top	26.1	Steam Turbine Generator	14.2
Step up Transformer Sides	26.1	Steam Turbine Generator	13.0
HRSG Inlet side	26.0	Generator Enclosure Top	12.7
Step up Transformer Top	25.8	Generator Enclosure Top	12.5
Step up Transformer Sides	25.8	Generator Encl Sides	11.9
Cooling Water Fin Fan Coolers	24.9	Generator Encl Sides	11.7
Gas Turbine Inlet	24.8	N Side of Turbine Enclosure	10.2
Gas Turbine Inlet	24.6	N Side of Turbine Enclosure	10.0
Air Cooled Condenser Pipe	23.7	Gas Turbine Enclosure Top	8.7
Air Cooled Condenser Pipe	23.6	Gas Turbine Enclosure Top	8.5
Air Cooled Condenser Pipe	23.5	Closed Cooling Water Pump	3.4
Air Cooled Condenser Pipe	23.4	Vacuum Pump	3.0
Air Cooled Condenser Pipe	23.4	Vacuum Pump	2.9
Air Cooled Condenser Pipe	23.3	Closed Cooling Water Pump	1.2
Air Cooled Condenser Pipe	23.2	S Sides of Turbine Enclosure	-1.8
Air Cooled Condenser Pipe	23.1	S Side of Turbine Enclosure	-2.0
Air Cooled Condenser Pipe	23.0	Fuel Gas	-2.6
Turbine Enclosure vent	22.7	Fuel Gas	-2.6
Turbine Enclosure vent	22.5	Stack Break Out	-3.0
Condensate Extract Pump	21.7	Stack Break Out	-3.2

APPENDIX C PROJECT LAYOUT



APPENDIX 7-A

LIST OF PROPERTY OWNERS

SUBMITTED ELECTRONICALLY ON COMPACT DISK

APPENDIX 8-A
CUMULATIVE PROJECTS – CITY OF PALMDALE

PALMDALE

a place to call home

DEVELOPMENT SUMMARY

APRIL 2014 – MARCH 2015

PLANNING DEPARTMENT, 38250 N. SIERRA HIGHWAY, PALMDALE, CALIFORNIA 93550

PHONE: 661/267-5200

FAX: 661/267-5233

WEB: www.cityofpalmdale.org

LEGEND

CUP:	CONDITIONAL USE PERMIT
EIR:	ENVIRONMENTAL IMPACT REPORT
GPA:	GENERAL PLAN AMENDMENT
MM:	MAJOR MODIFICATION
PA:	PRE-APPLICATION
SP:	SPECIFIC PLAN
SPR:	SITE PLAN REVIEW
TE:	TIME EXTENSION
TPM:	TENTATIVE PARCEL MAP
TTM:	TENTATIVE TRACT MAP
VAR:	VARIANCE
VTTM:	VESTING TENTATIVE TRACT MAP
ZC:	ZONE CHANGE

CASE #: ABC14-01

DESCRIPTION: ABC FINDING OF PUBLIC CONVENIENCE & NECESSITY - WALMART GROCERY

LOCATION: 3875 W RANCHO VISTA BLVD

APPLICANT: BRENT MCMANIGAL | PHONE: 909-890-4499 | LOTS: | UNITS:

PLANNER: | ACRES: | BLDG SQ FT:

APPLIED DATE: 11/06/2014

NUMBER OF PARCELS: **1**

3001089062

CASE #: CUP14-012

DESCRIPTION: 75' HIGH WIRELESS TELECOMMUNICATIONS TOWER

LOCATION: 5508 PEARBLOSSOM HIGHWAY

APPLICANT: YVONNE AUTRY | PHONE: | LOTS: | UNITS:

PLANNER: C CONTRERAS | ACRES: | BLDG SQ FT: 300

APPLIED DATE: 07/03/2014

NUMBER OF PARCELS: **1**

3051022055

CASE #: CUP14-018

DESCRIPTION: REQUEST TO ESTABLISH INCIDENTAL OFF-SALE ALCOHOLIC BEVERAGE SALES USE AND A FINDING OF PUBLIC CONVENIENCE AND NECESSITY FOR AN EXISTING GENERAL MERCHANDISE

LOCATION: 38360 20TH ST EAST (UNIT B)

APPLICANT: 99 CENTS ONLY STORES | PHONE: 323-881-9950 | LOTS: | UNITS:

PLANNER: J CARRILLO | ACRES: | BLDG SQ FT: 1,000

APPLIED DATE: 09/08/2014

NUMBER OF PARCELS: **1**

3018028035

CASE #: CUP15-011

DESCRIPTION: REQUEST TO ESTABLISH RESTAURANT USE WITH ALCOHOL SALES AND PARKING LOT IMPROVEMENTS

LOCATION: 100 FT SOUTH AVENUE Q3

APPLICANT: DORA ANDALUZ | PHONE: 818 464-6944 | LOTS: | UNITS:

PLANNER: | ACRES: | BLDG SQ FT: 2,857

APPLIED DATE: 02/24/2015

NUMBER OF PARCELS: **1**

3008012003

City of Palmdale Planning Department Development Summary Report - **Applied Projects**

CASE #: **PA15-003**

DESCRIPTION: REQUEST TO DEVELOP .98 ACRES INTO COMMERCIAL/RETAIL (1) BLDG TOTALING 5,857 SQUARE FEET

LOCATION: VAC/5TH PL EAST/VIC AVE Q9

APPLICANT: DYNAMIC DEVELOPMENT COMPANY LLC PHONE: 310-315-5411 LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 01/27/2015

NUMBER OF PARCELS: **1**

3009006013

CASE #: **PA15-004**

DESCRIPTION: REQUEST FOR BANQUET ROOM/LIVE ENTERTAINMENT

LOCATION: 2542 EAST PALMDALE BLVD

APPLICANT: EL CAMARON PELA'O MEXICAN AND SEAF(PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 02/02/2015

NUMBER OF PARCELS: **1**

3018026038

CASE #: **SPR14-009**

DESCRIPTION: A REQUEST TO DEVELOP 25 ACRES FOR SOLAR FROM APPROVED SPR 13-003 (160 ACRES)

LOCATION: SWC OF EAST AVE O AND 110TH ST EAST

APPLICANT: SEPV18 LLC PHONE: 310-826-8511 LOTS: UNITS:

PLANNER: J CARRILLO ACRES: BLDG SQ FT: 1,000

APPLIED DATE: 11/18/2014

NUMBER OF PARCELS: **1**

3028008015

CASE #: **SPR14-010**

DESCRIPTION: A REQUEST TO DEVELOP 24 ACRES FOR SOLAR FROM ORIGINAL SPR 13-003 (160 ACRES)

LOCATION: SWC OF EAST AVE 0 & 110TH ST EAST

APPLICANT: ONE TEN PARTNERS LLC PHONE: 818-571-7179 LOTS: UNITS:

PLANNER: J CARRILLO ACRES: BLDG SQ FT: 1,000

APPLIED DATE: 11/18/2014

NUMBER OF PARCELS: **1**

3028008015

CASE #: ZC14-01

DESCRIPTION: C-3 TO C-3 (MX)

LOCATION: NORTH OF RANCHO VISTA BLVD, WEST OF DIVISION

APPLICANT: BOB KEIL PHONE: 916-521-8856 LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 09/24/2014

NUMBER OF PARCELS: **1**

3005004093

CASE #: ZOI14-001

DESCRIPTION: ZONING ORDINANCE INTERPRETATION APPLICATION

LOCATION: 3905 CLUB RANCHO DRIVE

APPLICANT: DELTA GROUP ENGINEERING INC PHONE: 949-622-0333 LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 12/23/2014

NUMBER OF PARCELS: **1**

3001003150

CASE #: **CUP10-13MM**

DESCRIPTION: A REQUEST TO EXPAND AN EXISTING TOBACCO STORE TO A CONVINIENCE MARKET TO INCLUDE ALCOHOL SALES

LOCATION: 38410 10TH ST E

APPLICANT: RAYMOND BAUTISTA PHONE: 661-492-7288 LOTS: UNITS:

PLANNER: C CONTRERAS ACRES: BLDG SQ FT: 1,500

APPLIED DATE: 05/19/2014 APPROVED DATE: 10/09/2014 EXPIRES: 10/20/2017

NUMBER OF PARCELS: **1**

3015003001

CASE #: **CUP12-009**

DESCRIPTION: REQUEST TO ESTABLISH A CONVENIENCE STORE WITH ALCOHOL AND TOBACCO SALES

LOCATION: NEC OF AVENUE R AND 9TH ST E

APPLICANT: NABEEL HAWARA PHONE: LOTS: UNITS:

PLANNER: C CONTRERAS ACRES: BLDG SQ FT: 2,595

APPLIED DATE: 06/28/2012 APPROVED DATE: 11/13/2014 EXPIRES: 11/24/2017

NUMBER OF PARCELS: **1**

3009021033

CASE #: **CUP12-012M**

DESCRIPTION: MODIFY COA TO ESTABLISH A CONVENIENCE STORE USE INCLUDING THE SALE OF TOBACCO/SMOKING PRODUCTS WITHIN A 1,020 SQUARE FOOT LEASE SPACE LOCATED AT 38332

LOCATION: 38324 30TH ST E

APPLICANT: ALEX HAWARA PHONE: LOTS: UNITS:

PLANNER: C CONTRERAS ACRES: BLDG SQ FT:

APPLIED DATE: 10/29/2013 APPROVED DATE: 04/02/2014 EXPIRES:

NUMBER OF PARCELS: **1**

3020004071

CASE #: **CUP12-015**

DESCRIPTION: SWAP MEET (FOUR POINTS SWAP MEET CUP)

LOCATION: NWC PEARBLOSSOM HWY AND FORT TEJON

APPLICANT: RODNEY & JOYCE BRUCE PHONE: 661-273-3462 LOTS: UNITS:

PLANNER: C CONTRERAS ACRES: BLDG SQ FT: 96,668

APPLIED DATE: 11/08/2012 APPROVED DATE: 12/03/2014 EXPIRES: 12/02/2017

NUMBER OF PARCELS: **1**

3051021015

CASE #: **CUP14-006**

DESCRIPTION: A REQUEST TO ESTABLISH A BONA FIDE RESTAURANT (TYPE 41)

LOCATION: 2321 E AVENUE S

APPLICANT: EL TOREO INC. VINCENT MURILLO PHONE: 661-947-4177 LOTS: UNITS:

PLANNER: J CARRILLO ACRES: BLDG SQ FT: 3,745

APPLIED DATE: 04/10/2014 APPROVED DATE: 06/12/2014 EXPIRES: 06/23/2017

NUMBER OF PARCELS: **1**

3019015018

CASE #: **CUP14-008**

DESCRIPTION: PROPOSED INCIDENTAL OFF-SALE ALCOHOL SALES USE AND A FINDING OF PCN FOR EXISTING RETAIL STORE

LOCATION: LOCATED AT 442 W. RANCHO VITA BLVD

APPLICANT: 99 CENT ONLY STORES PHONE: 323 881-9950 LOTS: UNITS:

PLANNER: C CONTRERAS ACRES: BLDG SQ FT: 100

APPLIED DATE: 04/29/2014 APPROVED DATE: 01/08/2015 EXPIRES: 01/19/2018

NUMBER OF PARCELS: **1**

3006023028

CASE #: **CUP14-009**

DESCRIPTION: REQUEST TO ESTABLISH FITNESS CENTER WITHIN A LEASE SPACE TOTALING 31,361 SQ FT

LOCATION: 2210 E. PALMDALE BLVD, GENERALLY LOCATED

APPLICANT: PLUMP GROUP PHONE: 714-385-1835 LOTS: UNITS:

PLANNER: J CARRILLO ACRES: BLDG SQ FT: 19,080

APPLIED DATE: 05/28/2014 APPROVED DATE: 07/10/2014 EXPIRES: 07/21/2017

NUMBER OF PARCELS: **1**

3018028030

CASE #: **CUP14-010**

DESCRIPTION: REQUEST TO INCORPORATE A DRIVE-THROUGH TO AN EXISTING COMMERCIAL BUILDING

LOCATION: 38709 TIERRA SUBIDA AVE

APPLICANT: SCOTT HAGEN PHONE: LOTS: UNITS:

PLANNER: C CONTRERAS ACRES: BLDG SQ FT: 1,388

APPLIED DATE: 06/26/2014 APPROVED DATE: 11/13/2014 EXPIRES: 11/25/2017

NUMBER OF PARCELS: **1**

3004033018

CASE #: **CUP14-011**

DESCRIPTION: A request to construct a telecommunication facility

LOCATION: Civic Center

APPLICANT: YVONNE AUTRY / VERIZON WIRELESS PHONE: 949-799-2000 LOTS: UNITS:

PLANNER: C CONTRERAS ACRES: BLDG SQ FT: 1,000

APPLIED DATE: 06/30/2014 APPROVED DATE: 12/11/2014 EXPIRES: 12/23/2017

NUMBER OF PARCELS: **1**

3009017901

CASE #: **CUP14-013**

DESCRIPTION: 70' HIGH WIRELESS TELECOMMUNICATIONS TOWER

LOCATION: 420 EAST RANCHO VISTA BLVD

APPLICANT: YVONNE AUTRY PHONE: 99-286-8747 LOTS: UNITS:

PLANNER: J CARRILLO ACRES: BLDG SQ FT:

APPLIED DATE: 07/03/2014 APPROVED DATE: 11/13/2014 EXPIRES: 11/24/2017

NUMBER OF PARCELS: **1**

3006004047

CASE #: **CUP14-014**

DESCRIPTION: 65' HIGH WIRELESS TELECOMMUNICATIONS TOWER DISGUISED AS A WATER TANK

LOCATION: SWC AVENUE S AND 40TH ST EAST

APPLICANT: YVONNE AUTRY PHONE: LOTS: UNITS:

PLANNER: J CARRILLO ACRES: BLDG SQ FT:

APPLIED DATE: 07/03/2014 APPROVED DATE: 11/13/2014 EXPIRES: 11/24/2017

NUMBER OF PARCELS: **1**

3052009905

CASE #: **CUP14-016**

DESCRIPTION: REQUEST TO ESTABLISH AN INCIDENTAL ON-SALE ALCOHOLIC BEVERAGE USE WITHIN A BONA FIDE RESTAURANT. THE PROPOSED USE REQUIRES A TYPE 41 (ON-SALE BEER AND WINE -

LOCATION: NWC RANCHO VISTA BLVD AND 30TH ST WEST

APPLICANT: BOPHA KHORTH PHONE: 661-266-9400 LOTS: UNITS:

PLANNER: C CONTRERAS ACRES: BLDG SQ FT: 2,179

APPLIED DATE: 07/24/2014 APPROVED DATE: 10/09/2014 EXPIRES: 10/20/2017

NUMBER OF PARCELS: **1**

3001097002

CASE #: **CUP14-017**

DESCRIPTION: A REQUEST TO DEVELOP AN ASSISTED LIVING FACILITY TOTALING 117,900 SQUARE FEET TO BE LOCATED ON 6.08 ACRES

LOCATION: NWC OF RANCHO VISTA BLVD & DIVISION ST

APPLICANT: FCM CAPITAL PARTNERS | PHONE: | LOTS: | UNITS:

PLANNER: J CARRILLO | ACRES: | BLDG SQ FT: 117,900

APPLIED DATE: 08/05/2014 | APPROVED DATE: 12/11/2014 | EXPIRES: 12/10/2017

NUMBER OF PARCELS: **1**

3005004092

CASE #: **SPR14-004**

DESCRIPTION: A REQUEST TO CONSTRUCT A 20 MW PHOTOVOLTAIC FACILITY CONSISTING OF 160 ACRES

LOCATION: NEC OF AVE M & 30TH ST E

APPLICANT: NRG SOLAR OASIS, LLC | PHONE: | LOTS: | UNITS:

PLANNER: C CONTRERAS | ACRES: | BLDG SQ FT: 1,000

APPLIED DATE: 06/30/2014 | APPROVED DATE: 01/15/2015 | EXPIRES: 01/27/2018

NUMBER OF PARCELS: **1**

3170018081

CASE #: **SPR14-006**

DESCRIPTION: PROPOSAL TO CONSTRUCT A GROUND MOUNTED SOLAR PHOTOVOLTAIC FACILITY ON 39 ACRES LOCATED AT THE SOUTHEAST CORNER OF THE FUTURE ALIGNMENT OF AVE P AND 100TH ST

LOCATION: SE CORNER FUTURE ALIGN AVE P AND 100TH E

APPLICANT: LITTLE ROCK - PHAM SOLAR LLC | PHONE: | LOTS: | UNITS:

PLANNER: C CONTRERAS | ACRES: | BLDG SQ FT:

APPLIED DATE: 09/03/2014 | APPROVED DATE: 01/08/2015 | EXPIRES: 01/20/2018

NUMBER OF PARCELS: **1**

3028015054

CASE #: **SPR14-007**

DESCRIPTION: A PROPOSAL TO ADD A 14,711 SQUARE FOOT BUILDING FOR OFFICE USE TO THE EXISTING WATER TREATMENT FACILITY LOCATED AT 6500 WEST AVENUE N (APN 3204-022-903 AND 908)

LOCATION: 6500 WEST AVENUE N

APPLICANT: MIKE FLOOR | PHONE: 661-943-3201 | LOTS: | UNITS:

PLANNER: C CONTRERAS | ACRES: | BLDG SQ FT: 14,711

APPLIED DATE: 09/10/2014 | APPROVED DATE: 02/05/2015 | EXPIRES: 02/16/2018

NUMBER OF PARCELS: **2**

3204022903

3204022908

CASE #: **SPR14-008**

DESCRIPTION: A REQUEST TO DEVELOP A 1.4 ACRE PARCEL WITH A 4,152 SQUARE FOOT RETAIL/FOOD USE

LOCATION: AVE R & 47TH STREET EAST

APPLICANT: MGP X PROPERTIES LLC PHONE: 858-350-1977 LOTS: UNITS:

PLANNER: J CARRILLO ACRES: BLDG SQ FT:

APPLIED DATE: 10/08/2014 APPROVED DATE: 12/23/2014 EXPIRES: 01/06/2018

NUMBER OF PARCELS: **1**

3023097014

CASE #: **PA13-015**

DESCRIPTION: A REQUEST TO SUBDIVIDE A 9.69 ACRE PARCEL INTO TWO

LOCATION:

APPLICANT: CIVIL DESIGN AND DRAFTING / IMAD PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 07/03/2013 APPROVED DATE: EXPIRES: COMPLETED: 01/21/2015

NUMBER OF PARCELS: **1**

3204031116

CASE #: **PA13-016**

DESCRIPTION: PROPOSED MULTI-FAMILY RESIDENTIAL COMPLEX TO INCLUDE 36 UNITS

LOCATION:

APPLICANT: CORBIN INGRAM PHONE: 66 951-2492 LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 07/11/2013 APPROVED DATE: EXPIRES: COMPLETED: 01/21/2015

NUMBER OF PARCELS: **1**

3014009018

CASE #: **PA13-017**

DESCRIPTION: 6,39 SQ.FT. GAS STATION ON 4.14 ACRES

LOCATION: 39150 10TH ST W

APPLICANT: GASOLINE RETAIL FACILITIES CONSULTIN(PHONE: 323-665-0844 LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 07/30/2013 APPROVED DATE: EXPIRES: COMPLETED: 01/21/2015

NUMBER OF PARCELS: **1**

3003079018

CASE #: **PA13-018**

DESCRIPTION: A REQUEST TO SUBDIVIDE 80 ACRES INTO 203 LOTS

LOCATION: SEC OF 70TH ST. AND AVE R

APPLICANT: PIEMAN SHAYAN, SHAYAN CAPITAL, LLC PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 07/31/2013 APPROVED DATE: EXPIRES: COMPLETED: 01/22/2015

NUMBER OF PARCELS: **1**

3024013041

CASE #: **PA13-020**

DESCRIPTION: REQUEST FOR A ZONE CHANGE AND CONSTRUCT A SERVICE STATION WITH A CONVENIENCE STORE WITH ALCOHOL SALES, FULL SERVICE CAR WASH AND OIL LUBE

LOCATION: SWC OF AVE O AND 10TH ST W

APPLICANT: BABAK BARDI / AVICO INC. PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 08/14/2013 APPROVED DATE: EXPIRES: COMPLETED: 01/22/2015

NUMBER OF PARCELS: **1**

3005010025

CASE #: **PA13-022**

DESCRIPTION: A REQUEST TO EXPAND AN EXISTING EXPRESS CAR WASH

LOCATION: SWC 10TH ST W AND RANCHO VISTA BLVD

APPLICANT: D EDGE INC. PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 10/07/2013 APPROVED DATE: EXPIRES: COMPLETED: 01/22/2015

NUMBER OF PARCELS: **1**

3003003055

CASE #: **PA13-025**

DESCRIPTION: A REQUEST FOR A 12,381 SF OFFICE USE BUILDING

LOCATION: 6500 W AVE. N

APPLICANT: AVEK PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 11/14/2013 APPROVED DATE: EXPIRES: COMPLETED: 01/21/2015

NUMBER OF PARCELS: **1**

3204022908

CASE #: **PA13-026**

DESCRIPTION: SUBDIVIDE 30 ACRES INTO 41 LOTS TO INCLUDE 1 DETENTION BASIN LOCATED AT THE NWC OF THE FUTURE ALIGNMENT OF AVE M-8 AND 8TH ST WEST

LOCATION: NWC FUTURE ALIGNMENT OF AVE M-8 &8TH WES

APPLICANT: MR. RICHARD JACKSON PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 12/10/2013 APPROVED DATE: EXPIRES: COMPLETED: 01/21/2015

NUMBER OF PARCELS: **1**

3128015097

City of Palmdale Planning Department Development Summary Report - **Completed Projects**

CASE #: **PA13-027**

DESCRIPTION: ASSISTED LIVING & MEMORY CARE

LOCATION: NWC OF RANCHO VISTA & DIVISION

APPLICANT: FCM CAPITAL PARTNERS PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 12/19/2013 APPROVED DATE: EXPIRES: COMPLETED: 01/22/2015

NUMBER OF PARCELS: **1**

3005004092

CASE #: **PA14-001**

DESCRIPTION: A REQUEST TO ESTABLISH A CHURCH

LOCATION: 38580 9TH ST E

APPLICANT: REV. CELESTA ARI PHONE: 951-479-7084 LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 01/07/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/21/2015

NUMBER OF PARCELS: **1**

3008039022

CASE #: **PA14-002**

DESCRIPTION: 1,125 SQ.FT. AUTOMATIC CAR WASH

LOCATION: SWC AVE M & 10TH ST W

APPLICANT: TIM HADAYA PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 01/08/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/23/2015

NUMBER OF PARCELS: **1**

3111012091

CASE #: **PA14-003**

DESCRIPTION: PROPOSED 38,000 SQ. FT. RETAIL AND MEDICAL OFFICE BUILDINGS TO BE LOCATED W/IN AN EXISTING SHOPPING CENTER AT SWC OF TIERRASUBIDA AND PALMDALE BLVD

LOCATION: 38727 TIERRA SUBIDA

APPLICANT: MARTIN PROPERTIES INC PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 01/29/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/22/2015

NUMBER OF PARCELS: **1**

3004033014

CASE #: **PA14-004**

DESCRIPTION: A PROPOSAL TO DEVELOP A 403 PV SOLAR POWER PLANT

LOCATION: NORTH OF AVENUE M, ON BOTH SIDES OF 30TH

APPLICANT: NGR SOLAR OASIS LLC PHONE: 760-710-2205 LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 01/29/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/22/2015

NUMBER OF PARCELS: **1**

3170018081

CASE #: **PA14-006**

DESCRIPTION: PROPOSED CONVERSION OF SFM TO COMM

LOCATION: 963 E AVE Q9

APPLICANT: BILL KEMPTON PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 03/19/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/22/2015

NUMBER OF PARCELS: **1**

3009025011

CASE #: **PA14-007**

DESCRIPTION: PROPOSED LEGALIZATION OF EXISTING RELIGIOUS ASSEMBLY USE AND PROPOSED 6,817 SQ FT EXPANSION

LOCATION:

APPLICANT: GERMAN BONILLA PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 03/25/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/21/2015

NUMBER OF PARCELS: **1**

3020003029

CASE #: **PA14-008**

DESCRIPTION: UTILITY GRID PHOTOVOLTAIC GENERATING FACILITY

LOCATION: SWC OF E AVENUE P AND 110TH STREET EAST

APPLICANT: BOB WOOD PHONE: 951-356-1343 LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 03/26/2014 APPROVED DATE: EXPIRES: COMPLETED: 06/12/2014

NUMBER OF PARCELS: **1**

3028015054

City of Palmdale Planning Department Development Summary Report - **Completed Projects**

CASE #: **PA14-009**

DESCRIPTION: MULTI-FAMILY APARTMENTS

LOCATION: W/S OF 30TH ST E, S/O PALMDALE BLVD

APPLICANT: INVISION PHONE: 650-218-3223 LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 04/28/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/21/2015

NUMBER OF PARCELS: **1**

3018026001

CASE #: **PA14-010**

DESCRIPTION: SUBDIVIDE THE PARCEL INTO 4 FINISHED LOTS

LOCATION: N/O AVEN Q; W/S OF 20TH ST EAST

APPLICANT: INVISION DEVELOPMENT COMPANY PHONE: 650-218-3223 LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 04/28/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/21/2015

NUMBER OF PARCELS: **1**

3022013022

CASE #: **PA14-011**

DESCRIPTION: A REQUEST TO ESTABLISH A PRODUCTION MICRO-BREWERY

LOCATION: 610 WEST AVENUE O

APPLICANT: BRIAN SCHMITZ PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 05/28/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/22/2015

NUMBER OF PARCELS: **1**

3005045012

CASE #: **PA14-012**

DESCRIPTION: WIRELESS SITE

LOCATION: 3905 CLUB RANCHO DRIVE

APPLICANT: VERIZON WIRELESS PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 06/04/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/21/2015

NUMBER OF PARCELS: **1**

3001003150

CASE #: **PA14-013**

DESCRIPTION: A REQUEST TO ADD THREE COMMERCIAL BUILDINGS

LOCATION: 320 W RANCHO VISTA BLVD

APPLICANT: DON DE FILIPPO PHONE: 818-825-6826 LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 06/17/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/22/2015

NUMBER OF PARCELS: **1**

3006023025

CASE #: **PA14-014**

DESCRIPTION: ADDITION OF 2 BED/1 BATH (2 UNITS). LEGALIZE I BED- 1 BATH AND LEGALIZE ONE STORAGE ROOM. ADDTIONAL OFF STREET PARKING

LOCATION: 38128 10TH STREET EAST

APPLICANT: ROBERTO GONZALES PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 07/07/2014 APPROVED DATE: EXPIRES: COMPLETED: 09/11/2014

NUMBER OF PARCELS: **1**

3014002026

CASE #: **PA14-015**

DESCRIPTION: A REQUEST TO SUBDIVIDE 20 ACRES INTO 75 LOTS

LOCATION: SWC OF PALMDALE BLVD & 55TH S E

APPLICANT: ROSEMARIE ELM PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 07/23/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/22/2015

NUMBER OF PARCELS: **1**

3023002016

CASE #: **PA14-016**

DESCRIPTION: A REQUEST TO ESTABLISH A CONCRETE PRECAST LINING MANUFACTURING PLANT

LOCATION: 6205 E AVENUE T

APPLICANT: TRAYLOR PRECAST, LLC PHONE: 916-616-3704 LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 07/23/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/23/2015

NUMBER OF PARCELS: **1**

3051013028

CASE #: **PA14-017**

DESCRIPTION: A REQUEST TO DEVELOP A 1.4 ACRE PARCEL WITH A 4,152 SQUARE FOOT RETAIL/FOOD USE

LOCATION: NWC OF AVENUE R AND 47

APPLICANT: MARLONE GEIER PARTNERS PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 07/24/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/22/2015

NUMBER OF PARCELS: **1**

3023097014

CASE #: **PA14-018**

DESCRIPTION: DINING AREA & CLASSROOMS FOR SUNDAY SCHOOL

LOCATION: VAC/AVE Q15/VIC 17TH STE

APPLICANT: MARTA CANDRAY PHONE: 661-674-7115 LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 08/18/2014 APPROVED DATE: EXPIRES: COMPLETED: 10/21/2014

NUMBER OF PARCELS: **1**

3014010005

CASE #: **PA14-019**

DESCRIPTION: A REQUEST TO DEVELOP 5.83 ACRES INTO A MULTI-FAMILY DEVELOPMENT - 183 UNITS

LOCATION: COURSON CONNECTION

APPLICANT: META HOUSING CORPORATION PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 08/28/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/22/2015

NUMBER OF PARCELS: **1**

3009024935

CASE #: **PA14-020**

DESCRIPTION: PRE-OWNED AUTO SALES

LOCATION: NEC OF TECHNOLOGY DRIVE & 5TH ST WEST

APPLICANT: CARMAX AUTO SUPERSTORES PHONE: 720-445-4385 LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 09/10/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/22/2015

NUMBER OF PARCELS: **1**

3003081051

CASE #: **PA14-021**

DESCRIPTION: CONVERT 4.725 LOT TO 82 SFR LOTS

LOCATION: VAC/COR AVE R/DIVISION ST

APPLICANT: MARK BORMAN PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 09/11/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/22/2015

NUMBER OF PARCELS: **1**

3010030023

CASE #: **PA14-022**

DESCRIPTION: ADD 8,000 SF TO ANEXISTING BUILDING

LOCATION: 1401 WEST RANCHO VISTA BOULEVARD

APPLICANT: HANBALI AND ASSOCIATES PHONE: LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 10/22/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/07/2015

NUMBER OF PARCELS: **1**

3005038054

CASE #: **PA14-023**

DESCRIPTION: DEVELOP 39,248 SQ.FT. (0.9 ACRES) INTO A COMMERCIAL USE

LOCATION: S SIDE OF RANCHO VISTA BLVD, W OF 4TH ST E

APPLICANT: JUAN CARLOS HERRERA PHONE: 661-992-3209 LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 11/10/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/22/2015

NUMBER OF PARCELS: **2**

3006004041

3006004042

CASE #: **PA14-024**

DESCRIPTION: REQUEST TO DEVELOP 1 COMMERCIAL LOT 2700 SQUARE FEET

LOCATION: 2520 EAST PALMDALE BLVD

APPLICANT: ROBERT FRIEDMAN PHONE: 626-484-5251 LOTS: UNITS:

PLANNER: ACRES: BLDG SQ FT:

APPLIED DATE: 12/11/2014 APPROVED DATE: EXPIRES: COMPLETED: 01/22/2015

NUMBER OF PARCELS: **1**

3018026038

CASE #: **PA15-001**

DESCRIPTION: A REQUEST TO CONSTRUCT A BUDDHISTWORSHIP CENTER

LOCATION: 3347 EAST AVENUE S

APPLICANT: LE NGUYEN | PHONE: 714-858-3247 | LOTS: | UNITS:

PLANNER: | ACRES: | BLDG SQ FT:

APPLIED DATE: 01/26/2015 | APPROVED DATE: | EXPIRES: | COMPLETED: 03/23/2015

NUMBER OF PARCELS: **1**

3020010026

CASE #: **PA15-002**

DESCRIPTION: REQUEST TO DEVELOP 4.67 ACRES INTO OFFICE/MEDICAL USE WITH 4 BLDG'S

LOCATION: VAC/30TH STE/VIC PALMDALE BLVD

APPLICANT: JAMES FALLON | PHONE: 650-218-3223 | LOTS: | UNITS:

PLANNER: | ACRES: | BLDG SQ FT:

APPLIED DATE: 01/27/2015 | APPROVED DATE: | EXPIRES: | COMPLETED: 03/25/2015

NUMBER OF PARCELS: **1**

3018026001

APPENDIX 8-B
CUMULATIVE PROJECTS – CITY OF LANCASTER

RESIDENTIAL DEVELOPMENT SUMMARY REPORT

CITY OF LANCASTER
PLANNING DEPARTMENT
For more information, call (661) 723-6100

UPDATED: JUNE 2015

CONTENTS

*Expiration dates for maps and related cases reflect the automatic extensions granted by the passing of SB 1185 on July 15, 2008 (1-year), AB 333 on July 15, 2009 (2- year), AB 208 on July 15, 2011 (2-year), and AB 116 on July 11, 2013 (2-year).

Residential Development Annual Count – Permits Issued Since 1980

Year	Permits	Year	Permits
1980	398	2000	279
1981	259	2001	577
1982	198	2002	437
1983	530	2003	972
1984	575	2004	1740
1985	1397	2005	2799
1986	1134	2006	1663
1987	1252	2007	805
1988	1792	2008	232
1989	3344	2009	187
1990	841	2010	277
1991	680	2011	177
1992	929	2012	192
1993	491	2013	175
1994	341	2014	109
1995	290		
1996	282		
1997	422		
1998	296		
1999	341		

Approved Residential Tract Maps – Under Construction or Partially Constructed (through June 2015)

Tract No.	Related Cases	Project / Location	Zone	School District	Applicant / Owner	Homes Built	Lots Remaining	Total Lots
Approved Tract Maps Partially Constructed (INACTIVE)								
46818	CUP 88-20 TM 46290 TM 46870	30± gr ac SFR subdivision; SE corner of Ave I and 20th St E	R-7000	Eastside	Narcissa Homes, 17993 Hwy 18, #6 Apple Valley, CA 92307 (619) 242-5211	40	7	47
47583	TM 47771 CUP 02-04 SP 95-01	40± gr ac SFR subdivision; SE corner of 90th St W and Ave I	R-7000	Westside	K. Hovnanian/Forecast Homes 39959 Sierra Hwy #Z, Palmdale, CA 93550 / (661) 274-9998	35	102	137
47895		10± gr ac SFR subdivision; NW corner of Ave K-12 and Challenger Way	R-7000	Lancaster	Warner Land Corp. Box 7024, Tarzana, CA 91357 (818) 775-0200	24	15	39
54007		10± gr ac SFR subdivision; SW corner of Ave H-12 and Challenger Way	R-7000	Lancaster	Regency Hills Homes X, LLC 13347 Ventura Blvd #202, Sherman Oaks, CA 91423 / (909) 612-0163	0	43	43
54025		23± gr ac SFR subdivision; SE corner of 20th St E and Lancaster Bl	R-7000	Eastside	KB Home, 25155 Stanford Ave #B215 Valencia, CA 91355 / (661) 219-6880	0	98	98
54199	54199-01	14.7± gr ac SFR subdivision; NE corner of Ave H-8 and 5th St E	R-7000	Lancaster	First Pacific, 300 E State St Redlands, CA 92373 / (909) 798-3688	20	35	55
54406		4.9± gr ac SFR subdivision; west of 5th St E, approx. 500 ft. north of Ave K	R-7000	Lancaster	Silver Oaks Estates, 7785 E. Bridgewood Dr, Anaheim Hills, CA 92808 / (949) 494-2565	12	9	21
60858		38.3± gr ac SFR subdivision; south side of Ave I, approx. 320 feet east of 45th St W	R-7000	Lancaster	Beazer Homes, 27202 Turnberry Ln #200, Valencia, CA 91355 (661) 294-4600	0	143	143
61489	PM 61707 61489 61489-1	36.13± gr ac SFR subdivision; NW corner of 50th St W and Ave J-8	R-7000	Westside	Stratham Properties 2201 Dupont Dr #300 Irvine, CA 92612 / (949) 833-1554	61489:13 61489-1:0	61489:60 61489-1:79	61489:73 61489-1:79
61819	61817 61818	43.3± gr ac SFR subdivision; NW corner of 20th St E and Ave H-8	R-7000	Lancaster	Frontier Homes, 42225 10th St W #D Lancaster, CA 93534 / (661) 949-2439	82	69	151
Approved Tract Maps Partially Constructed (CUSTOM)								
37538		117± gr ac SFR subdivision (Royal Equestrian Estates); north side of Ave N between 40th and 42nd St W	RR-1	Westside	Western Consolidated Investors P.O. Box 1569, Lancaster, CA 93539	50	10	60
43677		16± gr ac SFR subdivision (Tierra del Sol); SE corner of Ave J-8 and 35 St E	RR-1	Eastside	AV Financial Corp., P.O. Box 828 Lancaster, CA 93534 / (661) 945-3511	135	2	137

Tract No.	Related Cases	Project / Location	Zone	School District	Applicant / Owner	Homes Built	Lots Remaining	Total Lots
44167	CUP 86-04 GPA 84-07 ZC 85-05 Ph 1: 45007 Ph 2: 44167	71± gr ac SFR subdivision (Los Hermanos); south of Ave M between 32nd and 40th St W	SRR	Westside	Gary Fischer, Thomas M. Wilson 44219 Sierra Highway Lancaster, CA 93535 (661) 942-4842	45007: 32 44167: 17	45007: 6 44167: 12	45007: 38 44167: 29
44990		16± gr ac SFR subdivision; SW corner of Ave L-8 and 22nd St W	RR-1	Westside	Don Putnam, 1610 W Ave L-4 Lancaster, CA 93534	13	1	14
47394		5.14± gr ac SFR subdivision; between 22nd and 23rd St W and approx. 334 ft. south of Ave L	SRR	Westside	Cecil and Ronnie Mauldlin 43259 Sinnott Street Quartz Hill, CA 93536 / (661) 943-5730	6	2	8
53375	Ph: 53375 Ph: 53375-01	60± gr ac SFR subdivision; NW corner of Ave M and 25th St W	RR-1	Westside	Dennis Pursley (Desert Sage) 807 W Ave J Lancaster, CA 93534 / (661) 948-5644	53375:28 53375-1:23	53375: 1 53375-1: 2	5337:29 53375-1:25
Approved Tract Maps Under Construction (ACTIVE)								
52655		20± gr ac SFR subdivision; between 17th and 18th St W, approx. 205 ft. south of Lancaster Blvd.	R-7000	Lancaster	KB Home (Gibraltar) 25155 Stanford Ave #B215 Valencia, CA 91355 / (661) 219-6880	62	0	62
53102	53102 53102-01 53102-02	TM 53102: 52± gr ac SFR subdivision: SW corner of Ave J-8 and 45th St W	R-7000	Westside	Pacific Communities (Larkspur) 100 Dove Street #100 Newport Beach, CA 92660 (949) 660-8988	53102: 10 53102-1:54 53102-2:58	53102:96 53102-1: 0 53102-2: 0	53102:106 53102-1:54 53102-2:58
54274		17± gr ac SFR subdivision; NE corner of 20th St E and Kettering St	R-7000	Eastside	Lancaster 20 Land, LLC (Kevin Walsh) 960 N Tustin St #385, Orange CA 92861 / (909) 917-3226	40	40	80
60034		27± gr ac SFR subdivision; SE corner of 60th St W and Ave J-8	R-7000	Westside	Harris Homes, Inc. 2127 Palos Verdes Drive North Lomita, CA 90717	33	73	106
60428		25± gr ac SFR subdivision; SW corner of 40th St W and Ave J-6	R-7000	Lancaster	American Premiere Homes 7116 Valjean Ave, Van Nuys, CA 91406 / (818) 779-3858	66	28	94
60943		10± gr ac SFR subdivision; south side of Ave K-8, approx. 660 ft east of Challenger Way	R-7000	Lancaster	KB Home (Dawn Creek) 25155 Stanford Ave #B215 Valencia, CA 91355 / (661) 219-6880	40	0	40
61078		17.5± gr ac SFR subdivision; NW corner of 15th St E and Ave K-8	R-7000	Lancaster	KB Home (Dawn Creek) 25155 Stanford Ave #B215 Valencia, CA 91355 / (661) 219-6880	67	0	67
61206		40.9± gr ac SFR subdivision; SE corner of 35th St E and Ave J	R-7000	Eastside	KB Home (Dorado Skies) 25155 Stanford Ave #B215 Valencia, CA 91355 / (661) 219-6880	105	64	169

Tract No.	Related Cases	Project / Location	Zone	School District	Applicant / Owner	Homes Built	Lots Remaining	Total Lots
61278		4± gr ac SFR subdivision; NE corner of Ave K-8 and Challenger Way	R-7000	Lancaster	KB Home (Dawn Creek) 25155 Stanford Ave #B215 Valencia, CA 91355 / (661) 219-6880	3	13	16
61542		4.36± gr ac SFR subdivision; approx. 296 ft. west of 56th St W, south side of Ave J-12	R-7000	Westside	Wells Eason Development 212 E Ave K6 Ste 330 Lancaster, CA 93535 / (661) 942-6071	8	14	22

Approved Residential Tract Maps – Recorded / No Permits Issued

Tract No.	Related Cases	Project / Location	Zone	School District	Applicant / Owner	Recorded Lots
Approved Recorded Tract Maps						
44439		8± gr ac SFR subdivision; SW corner of Ave L-12 and 70th St W	R-10000	Westside	Turnkey Developers, Inc., 5042 Wilshire Blvd #136 Los Angeles, CA 90036 / (310) 219-1617	23
61493		3.25± ac SFR subdivision; NE corner of 22nd St W and Ave J-4	R-7000	Lancaster	Pro Value Properties, Inc., P.O. Box 1065 Burbank, CA 91507 / (818) 769-7880	12
62845		37± gr ac SFR subdivision; NW corner of 32nd St W and Ave M	SRR	Westside	Davidon Homes, 1600 S. Main St #150 Walnut Creek, CA 94596 / (925) 945-8000	63
63595		1.31± gr ac SFR subdivision; NW corner of 37th St W and Ave J-6	R-7000	Lancaster	Trimark Pacific Homes, 31111 Agoura Rd #210 Westlake Village, CA 91361 / (818) 706-9797	5

SUMMARY INFORMATION – RECORDED LOTS AVAILABLE (through June 2014)

Partially built tracts (inactive)	660
Partially built tracts (custom)	36
Partially built tracts (active)	328
Recorded tracts not yet built	103
Total	1127

Approved Residential Tract Maps – Not Yet Recorded / Pending Expiration

Tract No.	Related Cases	Project / Location	Zone	School District	Applicant / Owner	Expiration Date	# of Lots
Approved Tentative Tract Maps							
48699		7.9± gr ac SFR subdivision; SE corner of 27th St W and Ave L-8	RR-1	Westside	Lance Johnson, 2164 W Ave K-14 Lancaster, CA 93536 / (661) 726-1700	8/16/15	7
52719 Rev.		20± gr ac SFR subdivision; NE corner of Ave K and 50th St W	R-7000	Lancaster	Pacific Communities Builders, 1000 Dove St #100 Newport Beach, CA 92660 / (949) 660-8988	3/21/16	78
53229 Rev.		483± gr ac SFR subdivision; bounded by Ave K, future 62nd St W, Ave L and 70th St W	R-7000 R-10000	Westside	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	10/17/15	1594
53642 Rev.		40± gr ac SFR subdivision; NE corner of Ave K-8 and 60th St W	R-7000	Westside	Pacific Communities Builders, 1000 Dove St #100 Newport Beach, CA 92660 / (949) 660-8988	4/19/16	161
54199	54199-02	40± gr ac SFR subdivision; NE corner of Ave H-8 and 5th St E	R-7000	Lancaster	First Pacific, 300 E State St Redlands, CA 92373 / (909) 798-3688	7/21/15	48
54382		2.5± gr ac SFR subdivision; SW corner of Ave J and 32nd St W	R-7000	Lancaster	EZ Home Development, 18130 Sherman Way Reseda, CA 91335 / (818) 285-0555	9/22/15	9
54384		10± gr ac SFR subdivision; SE corner of 35th St W and future Ave L-10	SRR	Westside	Advance Home Improvements, 15335 Morrison St #140, Sherman Oaks, CA 91405 / (818) 285-0555	11/17/15	17
54410		2.44± gr ac SFR subdivision; 270 ft. east of 23rd St W, on the north side of Ave K-8	R-15000	Lancaster	Davis and White LLC 9364 Hillery Dr #2012, San Diego, CA 92126 (619) 263-7475	10/20/15	5
54439		10.18± gr ac SFR subdivision; SE corner of 25th St E and Ave J-8	R-7000	Eastside	Schlesinger Family Ltd Partnership 9595 Wilshire Blvd, Beverly Hills, CA 91202 (310) 273-0824	10/20/15	34
60057		120± gr ac SFR subdivision; SE corner of Ave L-8 and 80th St W	R-10000	Westside	Pacific Communities Builders, 1000 Dove St #100 Newport Beach, CA 92660 / (949) 660-8988	6/21/16	302
60108		10.58± gr ac SFR subdivision; NE corner of Ave M-6 and 35th St W	SRR	Westside	Pacific Communities Builders, 1000 Dove St #100 Newport Beach, CA 92660 / (949) 660-8988	3/15/16	18
60289		8.5± gr ac SFR subdivision; SE corner of Ave J and 26th St E	R-7000	Eastside	First Pacific Homes LLC (Redlands Odyssey Homes), 300 E State St #100, Redlands, CA 92373 (909) 798-3688	11/15/15	30
60291		20± gr ac SFR subdivision; south side of Ave K-4, approx. 325 ft. west of 35th St W	R-7000	Lancaster	Fieldstone Communities 2 Ada #200, Irvine, CA 92618 (949) 640-6410	1/16/16	66
60294	GPA 03-03 ZC 03-03	30± gr ac SFR subdivision; NE corner of 65th St W and Ave J	R-7000	Westside	Global Investments (Aaron Rivani) 3470 Wilshire Blvd #1020, Los Angeles, CA 90010 / (213) 365-0005	12/15/15	99
60348	CUP 04-05	74.48± gr ac SFR subdivision; NE corner of 40th St W and Ave N	SRR	Westside	Pacific Communities Builders, 1000 Dove St #100 Newport Beach, CA 92660 / (949) 660-8988	5/22/16	162

Tract No.	Related Cases	Project / Location	Zone	School District	Applicant / Owner	Expiration Date	# of Lots
60367		30± gr ac SFR subdivision; NE corner of Lancaster Blvd and 37th St E	R-7000	Eastside	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	9/18/15	129
60430	48723 46923	23± gr ac SFR subdivision; NW corner of Ave K and 36th St W	R-7000	Lancaster	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	3/21/16	82
60489		15± gr ac SFR subdivision; NW corner of 22nd St E and Ave J-4	R-7000	Eastside	AV Land, LLC, 1718 Westwood Blvd Los Angeles, CA 90024 / (661) 722-3600	6/18/16	64
60490		7.63± gr ac SFR subdivision; NE corner of 26th St E and Ave J-4	R-7000	Eastside	AV Land, LLC, 1718 Westwood Blvd Los Angeles, CA 90024 / (661) 722-3600	7/17/16	29
60574		10± gr ac SFR subdivision; SW corner of 40th St W and Ave K-12	R-10000	Lancaster	Fahd Al-Soleiman, 8929 Wilshire Blvd #212 Beverly Hills, CA 90211 / (310) 360-7501	7/18/15	29
60654		2.5± gr ac SFR subdivision; south side of Ave J, approx. 165 ft. east of 33rd St W	R-7000	Lancaster	EZ Home Development (MBM Developing, Inc.) 4532 Murrieta Ave #109 Sherman Oaks, CA 91423 / (818) 448-3250	2/18/16	8
60664		8± gr ac SFR subdivision; between Ave K and K-4, approx. 200 ft. east of Buena Vista Way	R-7000	Lancaster	Fieldstone Communities 2 Ada #200, Irvine, CA 92618 (949) 640-6410	1/16/16	39
60818	TPM 61341	15.27± gr ac SFR subdivision; SW corner of 20th St W and Ave H	R-7000	Lancaster	Horne and Granz, 280 S Beverly Dr #204 Beverly Hills, CA 90212 / (310) 273-8200	8/15/15	46
60844		9.4± gr ac SFR subdivision; SW corner of 27th St W and Ave L-8	RR-1	Westside	Harold Shaffer, 3667 Scadlock Lane Sherman Oaks, CA 91403 / (818) 783-7651	9/20/15	8
60870		12± gr ac SFR subdivision; east of 20th St W, approx. 660 ft. south of Ave I	R-7000	Lancaster	AV Land (Ben Sayani), 830 W Ave L #133 Lancaster, CA 93534 / (661) 726-0172	9/19/15	44
60878		40± gr ac SFR subdivision; NE corner of future 85th St W and future Ave G-8	R-7000	Westside	Larwin Company, 16633 Ventura Blvd #1300 Encino, CA 91436 / (818) 986-8890	5/17/16	156
60879		17.7± gr ac SFR subdivision; NE corner of future 85th St W and future Ave G-8	R-7000	Westside	Larwin Company, 16633 Ventura Blvd #1300 Encino, CA 91436 / (818) 986-8890	5/17/16	63
60885		12.51± gr ac SFR subdivision; west side of 60th St W, approx. 290 ft. south of Ave J-8	R-7000	Westside	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	7/18/15	49
60949		26± gr ac SFR subdivision; SE corner of 30th St E and Nugent St	R-7000	Eastside	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	5/22/16	114
61038		10± gr ac SFR subdivision; west side of 60th St W, approx. 660 ft. north of Ave J	R-7000	Westside	Mark Seminaro, 18881 Von Karman Ave #150 Irvine, CA 92612 / (949) 715-3020	9/19/15	41
61040		15.1± gr ac SFR subdivision; NW corner of future 55th St W and future Ave K-14	R-7000	Westside	Lafferty Homes, 23404 Lyons Ave #477 Newhall, CA 91321 / (661) 310-0352	6/20/16	58

Tract No.	Related Cases	Project / Location	Zone	School District	Applicant / Owner	Expiration Date	# of Lots
61041		15.1± gr ac SFR subdivision; NE corner of 55th St W and Ave L	R-1000	Westside	Lafferty Homes, 23404 Lyons Ave #477 Newhall, CA 91321 / (661) 310-0352	6/20/16	40
61118	60294	9.98± gr ac SFR subdivision; NW corner of Ave J and 62nd St W	R-7000	Westside	Global Investments (Aaron Rivani) 3470 Wilshire Blvd #1020, Los Angeles, CA 90010 / (213) 365-0005	9/19/15	33
61133		22.51± gr ac SFR subdivision; SW corner of Ave K and 25th St E	R-10000	Eastside	American Premiere Homes, 7116 Valjean Ave Van Nuys, CA 91406 / (818) 779-3858	9/19/15	64
61248		40.9± gr ac SFR subdivision; SW corner of 35th St E and Ave J	R-7000	Eastside	United Engineering Group, 3595 E Inland Empire Blvd #2200, Ontario, CA 91764 / (909) 466-9240	6/19/16	165
61303		20± gr ac SFR subdivision; NE corner of 27th St E and Ave J	R-7000	Eastside	United Engineering Group, 3595 E Inland Empire Blvd #2200, Ontario, CA 91764 / (909) 466-9240	6/19/16	75
61314		30± gr ac SFR subdivision; south side of Ave K, approx. 660 ft. east of 25th St E	R-10000	Eastside	Kairos Fund, LP, 2155 E. Garvey Ave West Covina, CA 91791 / (626) 938-1988	12/19/15	84
61480		28.97± gr ac SFR subdivision; NE corner of future 35th St E and Lancaster Blvd	R-7000	Eastside	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	10/17/15	130
61490		20± gr ac SFR subdivision; NE corner of future 55th St W and future Ave J-8	R-7000	Westside	Hearthside Homes, Inc., 6 Executive Circle #250 Irvine, CA 92614 / (949) 250-7700	7/18/15	73
61491		10.24± gr ac SFR subdivision; NE corner of 22nd St E and Lancaster Blvd	R-7000	Eastside	Rebecca Rowe, 15626 Warm Springs Drive Canyon Country, CA 91387 / (661) 360-9133	10/17/15	33
61535		57.6± gr ac SFR subdivision; SE corner of 45th St W and Ave J	R-7000	Lancaster	The Wynnwood Co. LLC, 19800 MacArthur Blvd #700, Irvine, CA 92612 / (949) 655-7030	10/17/15	240
61549		8.7± gr ac SFR subdivision; SW corner of 15th St E and Ave I	R-7000	Lancaster	Floraville, Inc., 22101 Erwin St #P219 Woodland Hills, CA 91367 / (818) 999-4117	11/21/15	38
61554		5± gr ac SFR subdivision; NE corner of 55th St W and Ave j-4	R-7000	Westside	Taft Corporation, 26740 Via Linda St Malibu, CA 90265 / (310) 437-9190	2/21/16	20
61555	CUP 05-15	18.25± gr ac SFR subdivision; NE and SE corner of 40th St W and Ave M	SRR	Westside	Ben Kwon, P.O. Box 903056 Palmdale, CA 93590 / (661) 274-9398	12/22/15	27
61573		20.16± gr ac SFR subdivision; SE corner of 20th St E and Ave H-8	R-7000	Lancaster	United Engineering Group, 3595 E Inland Empire Blvd #2200, Ontario, CA 91764 / (909) 466-9240	5/22/16	81
61574		14.3± gr ac SFR subdivision; NW corner of 30th St E and Ave K-4	R-10000	Eastside	United Engineering Group, 3595 E Inland Empire Blvd #2200, Ontario, CA 91764 / (909) 466-9240	7/17/15	45
61586		40± gr ac SFR subdivision; SE corner of 20th St E and Ave H	R-7000	Eastside	Kim & Meyer Investment Co., 11 Clearwater Pt Sanford, NC 27332 / (919) 499-9409	4/21/17	151
61600		7.5± gr ac SFR subdivision; approx. 640 ft. east of 60th St W, south side of Ave K-12	R-7000	Westside	Taft Corporation 26740 Via Linda, Malibu, CA 90265 (310) 437-9190	6/20/16	33

Tract No.	Related Cases	Project / Location	Zone	School District	Applicant / Owner	Expiration Date	# of Lots
61677		15± gr ac SFR subdivision; SW corner of 57th St W and Ave K	R-7000	Westside	Lancaster 58 LLC (Jon Friedman) 1435 Reynolds Ct, Thousand Oaks, CA 91362 (805) 373-2860	8/15/15	58
61678		15.14± gr ac SFR subdivision; SE corner of Ave K and future 57th St W	R-7000	Westside	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	9/18/15	58
61679		20.15± gr ac SFR subdivision; SE corner of 55th St W and Ave K	R-10000	Westside	Lancaster Downs 115, LLC (c/o McComic Consolidated Inc.), 10721 Treena St #200 San Diego, CA 92131 / (858) 653-3003	10/17/15	55
61681		15± gr ac SFR subdivision; NE corner of 36th St W and Ave J-12	R-7000	Lancaster	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	11/21/15	57
61721		20.35± gr ac SFR subdivision; NE corner of Ave J and future 37th St E	R-7000	Eastside	Land Resources Concepts, Inc. (Darren Proulx) 325 Harbor Cove Dr #211, Sparks, NV 89434 (775) 358-4426	7/17/15	78
61733		10± gr ac SFR subdivision; NE corner of 27th St W and Ave L-4	SRR	Westside	Icon Properties Inc. (Syed Nasseeruddin) 2152 Mark Ave, Palmdale, CA 93550 (323) 302-4489	7/18/15	18
61734		5± gr ac SFR subdivision; approx. 663 ft. north of Ave J-12, approx. 658 ft. west of 60th St W	R-7000	Westside	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	7/18/15	19
61749		3.13± gr ac SFR subdivision; east side of Genoa Ave, approx. 415 ft. north of Ave J	R-7000	Lancaster	Hooshang Harooni 1508 Veteran Ave #302, Los Angeles, CA 90024 (310) 473-1550	8/21/15	14
61817	61818 61819	36.8± gr ac SFR subdivision; NE corner of 15th St E and Ave H-8	R-7000	Lancaster	Frontier Homes, 9331 Mariposa Rd #A Hesperia, CA 92344 / (760) 946-7231	12/19/15	151
61818	61817 61819	39.8± gr ac SFR subdivision; SE corner of 15th St E and Ave H	R-7000	Lancaster	Frontier Homes, 9331 Mariposa Rd #A Hesperia, CA 92344 / (760) 946-7231	12/19/15	131
61907		38.81± gr ac SFR subdivision; SE corner of 20th St E and Ave H	R-7000	Lancaster	ELLIA Development Co. (Alvin Villanueva) P.O. Box 997, Sun Valley, CA 92353 (818) 767-2733	4/21/17	22
61915		20.32± gr ac SFR subdivision; NW corner of 35th St W and Ave L-8	SRR	Westside	PJDYH, LLC (Betty Kalaf), 18648 Erwin St Tarzana, CA 91335 / (818) 996-1410	1/17/16	33
61920		40± gr ac SFR subdivision; NE corner of future 55th St W and Ave K	R-10000 R-15000	Westside	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	7/18/16	108
61921		20.6± gr ac SFR subdivision; NE corner of 40th St W and Ave J	R-7000	Lancaster	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	4/17/16	77

Tract No.	Related Cases	Project / Location	Zone	School District	Applicant / Owner	Expiration Date	# of Lots
61966		9.74± gr ac SFR subdivision; south side of Ave I, approx. 336 ft west side of 37th St W	R-7000	Lancaster	Global Investments (Aaron Rivani) 3470 Wilshire Blvd #1020, Los Angeles, CA 90010 / (213) 365-0005	9/19/15	35
61970		2.43± gr ac SFR subdivision; SE corner of Carol Drive (12th St E) and Ave K-6	R-7000	Lancaster	Taft Corporation, 26740 Via Linda, Malibu, CA 90265 / (310) 437-9190	1/17/16	9
61973		4.76± gr ac SFR subdivision; north side of Ave J-8, approx. 300 ft east of 35th St W	R-7000	Lancaster	Global Investments (Aaron Rivani) 3470 Wilshire Blvd #1020, Los Angeles, CA 90010 / (213) 365-0005	8/15/15	18
61977		3.75± gr ac SFR subdivision; approx. 660 ft. west of 15th St E, south side of Ave K-4	R-7000	Lancaster	Taft Corporation, 26740 Via Linda, Malibu, CA 90265 / (310) 437-9190	10/17/15	16
61989		20.25± gr ac SFR subdivision; SW corner of 67th St W and Ave L	R-10000	Westside	Lancaster Downs 115, LLC, 10721 Treena St #200 San Diego, CA 92131 / (858) 653-3003	12/19/15	56
62052		20± gr ac SFR subdivision; SW corner of Ave I and 12th St E	R-7000	Lancaster	Mahmud Rawjee, 1111 Santa Monica Blvd #500 Santa Monica, CA 90025 / (310) 444-6377	10/16/15	81
62120		80± gr ac SFR subdivision; SE corner of 40th St W and Lancaster Blvd	R-7000	Lancaster	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	5/22/16	316
62121		30.3± gr ac SFR subdivision; NW corner of 40th St W and Ave K	R-7000	Lancaster	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	10/16/15	115
62206		10± gr ac SFR subdivision; SW corner of 37th St W and Ave I	R-7000	Lancaster	Global Investments (Aaron Rivani) 3470 Wilshire Blvd #1020, Los Angeles, CA 90010 / (213) 365-0005	9/19/15	34
62207		7.5± gr ac SFR subdivision; SW corner of 26th St E and Ave J-4	R-7000	Eastside	Global Investments (Aaron Rivani) 3470 Wilshire Blvd #1020, Los Angeles, CA 90010 / (213) 365-0005	2/19/15	29
62208		11.68± gr ac SFR subdivision; south side of Ave I, approx. 400 ft. west of 40th St W	R-7000	Lancaster	Global Investments (Aaron Rivani) 3470 Wilshire Blvd #1020, Los Angeles, CA 90010 / (213) 365-0005	8/15/15	41
62215		13± gr ac SFR subdivision; NE corner of 40th St W and Ave L-8	SRR	Westside	Pacific Communities Builders, 1000 Dove St #100 Newport Beach, CA 92660 / (949) 660-8988	12/19/15	23
62247		5.03± gr ac SFR subdivision; SE corner of 28th St W and Ave L-10	RR-1	Westside	Dennis Pursley, 807 W Ave J Lancaster, CA 93534 / (661) 948-5644	12/19/15	4
62321		20± gr ac SFR subdivision; NE corner of 25th St E and Lancaster Blvd	R-7000	Eastside	RWR Homes, Inc., 16461 Sherman Way #350 Van Nuys, CA 91460 / (818) 780-3334	9/19/15	80
62349		20.56± gr ac SFR subdivision; NE corner of 20th St E and Ave H-12	R-7000	Eastside	United Engineering Group, 3595 E Inland Empire Blvd #2200, Ontario, CA 91764 / (909) 466-9240	9/18/15	78

Tract No.	Related Cases	Project / Location	Zone	School District	Applicant / Owner	Expiration Date	# of Lots
62403		64.22± gr ac SFR subdivision; SE corner of future 80th St W and Ave L	R-10000	Westside	Bayshore LLC & Crown Jewels, LLC (Scott Miller), 1925 Century Park E #1160, Los Angeles, CA 90067 / (310) 201-0262	12/19/15	204
62409		10± gr ac SFR subdivision; NE corner of Ave K and 65th St W	R-7000	Westside	Pacific Land Company, 1925 Century Park E #1130, Los Angeles, CA 90067 / (310) 201-0262	12/19/15	37
62478		20± gr ac SFR subdivision; SE corner of future 35th St E and Ave I	R-7000	Eastside	RWR Homes Inc., 16461 Sherman Way #325 Van Nuys, CA 91460 / (818) 780-3334	10/17/15	79
62485		10.09± gr ac SFR subdivision; SW corner of 30th St E and future Nugent St	R-7000	Eastside	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	7/17/15	39
62520		6.8± gr ac SFR subdivision; NE corner of future 37th St W and Ave M-2	SRR	Westside	All California Funding (Bob Emery) 14958 Ventura Blvd #200, Sherman Oaks, CA 91403 / (818) 990-1100	8/20/16	11
62578		20.1± gr ac SFR subdivision; west side of 40th St W and Ave J-12	R-7000	Lancaster	American Premiere Homes, 7116 Valjean Ave Van Nuys, CA 91406 / (818) 779-3800	11/21/15	87
62579		21± gr ac SFR subdivision; SE corner of 40th St W and Jackman St	R-7000	Lancaster	American Premiere Homes, 7116 Valjean Ave Van Nuys, CA 91406 / (818) 779-3800	12/18/15	88
62635		16.93± gr ac SFR subdivision; SE corner of 12th St E and Ave I	R-7000	Lancaster	Lancaster 68 Lots (owner: Kahn Family Trust) c/o NAI Capital (Scott Lisk, agent), 2280 Market St #150, Riverside, CA 92501 / (951) 346-0800	11/21/15	78
62643		24.92± gr ac SFR subdivision; NW corner of 45th St W and Ave J-8	R-7000	Lancaster	Pacific Communities Builders, 1000 Dove St #100 Newport Beach, CA 92660 / (949) 660-8988	2/20/16	93
62664		17.5± gr ac SFR subdivision; SE corner of 40th St W and Ave M-4	SRR	Westside	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	11/21/15	30
62793		42± gr ac SFR subdivision; SE corner of 40th St W and future Ave H-8	R-7000	Lancaster	Behrooz Haverim, 903 Maple Ave Los Angeles, CA 90015 / (213) 955-4204	1/17/16	153
62841		10± gr ac SFR subdivision; NE corner of 40th St W and Newgrove St	R-7000	Lancaster	Rialto Capital (Ryan Schierberl), 25 Enterprise, Aliso Viejo, CA 92656 / (949) 389-1405	12/19/15	60
62873		2.5± gr ac SFR subdivision; NE corner of 7th St E and Ave K	R-7000	Lancaster	Rahgan Real Estate Development (Arsalan Hayatdayoodi), 42151 Summer Lane, Lancaster, CA 93536 / (661) 943-9356	2/21/16	9
62916		19.64± gr ac SFR subdivision; on the north side of Lancaster Blvd, approx. 290 ft. east of 45th St W	R-7000	Westside	Global Investments (Aaron Rivani) 3470 Wilshire Blvd #1020, Los Angeles, CA 90010 / (213) 365-0005	1/17/16	84
62925		64.3± gr ac SFR subdivision; NE corner of future 85th St W and future Ave M-4	R-10000	Westside	Ariel Properties, 5022 W Ave N #104 Palmdale, CA 93551 / (661) 722-3600	1/17/16	183
62979		20± gr ac SFR subdivision; SW corner of 45th St W and Jackman	R-7000	Lancaster	Pacific Land Company, 1925 Century Park E #1130, Los Angeles, CA 90067 / (310) 201-0262	2/21/16	88

Tract No.	Related Cases	Project / Location	Zone	School District	Applicant / Owner	Expiration Date	# of Lots
62998		10.63± gr ac SFR subdivision; NE corner of 32nd St W and Ave M	SRR	Westside	Dennis Pursley, 807 W Ave J Lancaster, CA 93534 / (661) 948-5644	5/22/16	15
63031		10± gr ac SFR subdivision; SW corner of 32nd St E and Lancaster Blvd	R-7000	Eastside	Pacific Land Company, 1925 Century Park E #1130, Los Angeles, CA 90067 / (310) 201-0262	6/19/16	25
63095		12.66± gr ac SFR subdivision; NW corner of 36th St W and Ave J	R-7000	Lancaster	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	6/18/16	41
63112		31.3± gr ac SFR subdivision; SE corner of 15th St E and Ave H-8	R-7000	Lancaster	Pacific Land Company, 1925 Century Park E #1130, Los Angeles, CA 90067 / (310) 201-0262	6/19/16	126
63137		20± gr ac SFR subdivision; NW corner of 40th St E and Ave J	R-7000	Eastside	Dear Properties, 8950 Olympic Blvd Beverly Hills, CA 90211 / (213) 249-1900	4/16/16	75
63201		4.7± gr ac SFR subdivision; on the north side of Ave J-8, approx. 660 ft west of 20th St W	R-7000	Lancaster	Hill View Homes, P.O. Box 32710 Quartz Hill, CA 93536 / (661) 722-1710	7/17/16	19
63215	CUP 05-26	20± gr ac SFR subdivision; SW corner of 42nd St W and Ave H	MDR R-7000	Lancaster	Taft Corporation, 26740 Via Linda Malibu, CA 90265 / (310) 437-9190	5/21/16	115
63241		9.69± gr ac SFR subdivision; NE corner of 25th St W and Ave M	RR-1	Westside	Jay Solomon, P.O. Box 3327 Quartz Hill, CA 93586 / (661) 538-1841	12/19/15	8
63247		7.23± gr ac SFR subdivision; on the north side of Ave N, approx. 335 ft. west of 42nd St W	SRR	Westside	Bola Akinpelu, 3070 Olympic View Dr Chino Hills, CA 91709 / (909) 590-8821	1/17/16	11
63282		47.2± gr ac SFR subdivision; NW corner of Ave I and 40th St W	R-7000	Westside	American Premiere Homes, 7116 Valjean Ave Van Nuys, CA 91406 / (818) 779-3800	9/18/15	177
63283		20.3± gr ac SFR subdivision; NE corner of 42nd St W and Ave I	R-7000	Lancaster	American Premiere Homes, 7116 Valjean Ave Van Nuys, CA 91406 / (818) 779-3800	9/18/15	85
63288		14.36± gr ac SFR subdivision; SW corner of 20th St E and future Ave H-12	R-7000	Lancaster	Cal Pac Development, LLC, 12325 Tiara St Valley Village, CA 91607 / (818) 506-8313	1/28/17	60
63314	66285	38.82± gr ac SFR subdivision; NW corner of 35th St E and Ave J-8	R-7000	Eastside	Moresun Development, 8808 Mission Dr #208 Rosemead, CA 91770 / (626) 285-9388	12/15/16	153
63365		28.5± gr ac SFR subdivision; NW corner of future 37th St E and Ave J	R-7000	Eastside	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	9/17/16	114
63786		10± gr ac SFR subdivision; NW corner of 30th St E and Ave J-8	R-7000	Eastside	LMH Development LLC, P.O. Box 3271 Quartz Hill, CA 93586 / (661) 478-2299	10/16/15	37
64211		5± gr ac SFR subdivision; NE corner of 35th St W and Ave J-8	R-7000	Lancaster	Cambridge Homes, Inc., 17189 Yuma St Victorville, CA 92395 / (760) 245-5130	2/21/16	18
64244		10± gr ac SFR subdivision; SE corner of 42nd St W and Ave I	R-7000	Lancaster	Global Investments (Aaron Rivani) 3470 Wilshire Blvd #1020, Los Angeles, CA 90010 / (213) 365-0005	6/19/16	37

Tract No.	Related Cases	Project / Location	Zone	School District	Applicant / Owner	Expiration Date	# of Lots
64249		5± gr ac SFR subdivision; SW corner of 32nd St W and Ave M-4	SRR	Westside	Andrew Eliopulos, 42225 10th St W #101 Lancaster, CA 93534 / (661) 942-8481	6/19/16	9
64250		23.65± gr ac SFR subdivision; NW corner of 40th St W and Lancaster Blvd	R-7000	Lancaster	Global Investments (Aaron Rivani) 3470 Wilshire Blvd #1020, Los Angeles, CA 90010 / (213) 365-0005	1/17/16	125
64392		23.5± gr ac SFR subdivision; SE corner of Challenger Way and Ave H-12	R-7000	Lancaster	Bay Development Group LLC, 377 W Fallbrook Ave #201, Fresno, CA 98371 / (559) 447-9800	10/16/15	91
64752		5± gr ac SFR subdivision; SE corner of Ave M-4 and future 35th St W	SRR	Westside	RI Properties, 43253 32nd St W Lancaster, CA 93536 / (661) 722-7509	8/21/15	8
64753		9.17± gr ac SFR subdivision; NE corner of Challenger Way and Kettering St	R-7000	Lancaster	Chris Canaday, 3194 Airport Dr #C-2 Costa Mesa, CA 92626 / (714) 327-1710	9/18/15	37
64877		9.42± gr ac SFR subdivision; NE corner of 20th St E and Nugent St	R-7000	Eastside	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	8/21/15	41
64922		20± gr ac SFR subdivision; NW corner of 60th St W and Ave K-12	R-7000	Westside	P&S Development (Andrew Park), 3453 W 8th St Los Angeles, CA 90005 / (213) 487-6487	9/18/15	84
64965		11.4± gr ac SFR subdivision; NW corner of Challenger Way and Ave H-4	R-7000	Lancaster	Lancaster Two Trust, P.O. Box 418 Cupertino, CA 95015 / (650) 969-0809	4/16/16	48
65186		17.7± gr ac SFR subdivision; NE corner of Ave J and future 42nd St W	R-7000	Lancaster	Pacific Land Company, 1925 Century Park E #1130, Los Angeles, CA 90067 / (310) 201-0262	9/18/15	73
65401		4.77± gr ac SFR subdivision; approx. 600 ft. north of Ave L on the east side of 27th St W	R-7000	Lancaster	Cal Pac Development, LLC, 12325 Tiara St Valley Village, CA 91607 / (818) 506-8354	10/15/16	19
65402		2.53± gr ac SFR subdivision; SE corner of future 25th St E and Ave J-4	R-7000	Eastside	Global Investments (Aaron Rivani) 3470 Wilshire Blvd #1020, Los Angeles, CA 90010 / (213) 365-0005	10/16/15	10
65520		10± gr ac SFR subdivision; SE corner of Ave I and future 37th St W	R-7000	Eastside	Global Investments (Aaron Rivani) 3470 Wilshire Blvd #1020, Los Angeles, CA 90010 / (213) 365-0005	8/21/15	34
66062		56.4± gr ac SFR subdivision; SE corner of future 85th St W and future Ave L-8	R-10000	Westside	Ariel Properties, 5022 W Ave N #104 Palmdale, CA 93551 / (661) 722-3600	1/17/16	111
66161		10± gr ac SFR subdivision; NW corner of Lancaster Blvd and 23rd St E	R-7000	Eastside	Canaday & Company, 3194 Airport Loop Dr #C-2 Costa Mesa, CA 92626 / (714) 327-1710	11/20/15	38
66209		10.11± gr ac SFR subdivision; SW corner of 15th St E and Lancaster Blvd	R-7000	Lancaster	Royal Investors Group (Athena Bowyer) 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	6/18/16	35
66217		1.86± gr ac SFR subdivision; on the west side of 17th St W, approx 350 feet north of Lancaster Blvd	R-7000	Lancaster	Medgar Parrish, 4137 Terraza Dr Los Angeles, CA 90008 / (323) 707-9361	1/17/16	8

Tract No.	Related Cases	Project / Location	Zone	School District	Applicant / Owner	Expiration Date	# of Lots
66241	CUP 05-16 DA 89-01	640± gr ac SFR master planned community (Del Sur); between Ave G and Ave H and 92nd St W and 105th St W	R-7000 R-10000	Westside	Larwin Company (Michael Badner) 16633 Ventura Blvd #1300 Encino, CA 91436 / (818) 986-8890	10/17/18	1925
66285	63314	40.47± gr ac SFR subdivision; NE corner of 30th St E and Ave J-8	R-7000	Eastside	Moresun Development, 8808 Mission Dr #208 Rosemead, CA 91770 / (626) 285-9388	12/15/16	169
66353		11.5± gr ac SFR subdivision; SW corner of Division St and Ave J-8	R-7000	Lancaster	So Cal Homes, 42837 Elena St Lancaster, CA 93536 / (661) 726-5905	6/18/16	39
66396		5± gr ac SFR subdivision; NW corner of Ave N and 42nd St W	SRR	Westside	Kenneth Berglund, 918 E Palmdale Blvd Palmdale, CA 93550 / (661) 947-8955	8/20/16	7
66408		4.77± gr ac SFR subdivision; west side of 22nd St E and north of Ave J-6	R-7000	Eastside	AV Land (Ben Sayani), 830 Ave L #133 Lancaster, CA 93534 / (661) 726-0172	10/19/15	20
66607		4.9± gr ac SFR subdivision; NE corner of 3rd St E and Lightcap	R-7000	Lancaster	Wendy Betton, 28821 Eagleton St Agoura Hills, CA 91301 / (818) 706-0907	6/18/16	5
66620		8.45± gr ac SFR subdivision; NW corner of Ave M and 23rd St W	RR-1	Westside	Shin Il Lee, 10729 Amber Hill Dr Whittier, CA 90601 / (562) 695-5034	7/16/16	9
66624		5.24± gr ac SFR subdivision; on the west side of Challenger Way and south of future Ave H-4	R-7000	Lancaster	Dung Chi Chu, 1885 Robin Rd San Marino, CA 91108	1/20/17	18
66666		2.53± gr ac SFR subdivision; on the north side of future Jackman St west of 40th St W	R-7000	Lancaster	Global Investments (Aaron Rivani) 3470 Wilshire Blvd #1020, Los Angeles, CA 90010 / (213) 365-0005	2/20/16	8
66667		3.96± gr ac SFR subdivision; SW corner of 40th St W and Ave I	R-7000	Lancaster	Global Investments (Aaron Rivani) 3470 Wilshire Blvd #1020, Los Angeles, CA 90010 / (213) 365-0005	2/20/16	12
66680	TPM 69747 TPM 70303	72.9± gr ac SFR subdivision; SW corner of 52nd St W and Ave K-8	R-7000 R-10000 R-15000	Westside	Stratham Properties, 2201 Dupont Dr #300 Irvine, CA 92612 / (949) 833-1554	8/18/16	238
66793		5± gr ac SFR subdivision; on the west side of 30th St W and Ave M-6	SRR	Westside	N.R. Anantharamakrish, 26519 Basswood Ave Rancho Palos Verdes, CA 90275 / (310) 791-4442	10/15/16	8
66802		40.3± gr ac SFR subdivision; NE corner of 70th St W and Ave L-8	R-10000	Westside	Robert L. Miller, 5625 Penland Rd Hidden Hills, CA 91302 / (919) 883-0941	4/16/16	110
67239 Rev		30.66± gr ac SFR subdivision; NW corner of 35th St W and Ave M-8	SRR	Westside	Royal Investors Group 15821 Ventura Blvd #460, Encino, CA 91436 (818) 981-3380 x110	2/19/17	49
67494		9.55± gr ac SFR subdivision, NE corner of Ave L and 52nd St W	R-15000	Westside	AV Land (Ben Sayani), 830 Ave L #133 Lancaster, CA 93534 / (661) 726-0172	4/21/17	19
67582		1.71± gr ac SFR subdivision; NE corner of Ave J-8 and 52nd St W	R-7000	Westside	Stratham Properties, 2201 Dupont Dr #300 Irvine, CA 92612 / (949) 833-1554	6/18/16	8

Tract No.	Related Cases	Project / Location	Zone	School District	Applicant / Owner	Expiration Date	# of Lots
67591		4.7± gr ac SFR subdivision; NE corner of 45th St W and future Ave M-14	SRR	Westside	Parviz Davani, 4809 Norwich Ave Sherman Oaks, CA 91403 / (818) 516-2446	11/16/15	7
68547		1.61± gr ac SFR subdivision; approx. 206 ft south of Ave J, approx. 410 ft from 8th St E	R-7000	Lancaster	Gloria and Manuel Munoz Corral 1845 Thomas Dr, Lancaster CA, 93534 (661) 441-9237	10/19/15	6
68722		21.99± gr ac SFR subdivision; SE corner of 20th St W and future Ave K-8	RR-1	Eastside	Missak Sarkissian & Anne Sarkissian 140 S Cliffwood, Los Angeles, CA 90094 (310) 260-4884	6/16/17	20
69356		17.62± gr ac SFR subdivision; SW corner of 40th St W and future Ave M-2	SRR	Westside	Mike Buckley, 6107 Heathercreek Way San Jose, CA 95123 / (408) 266-2746	6/16/17	25
69466		10± gr ac SFR subdivision; SW corner of 35th St W and future Ave M-4	SRR	Westside	Dennis Pursley, P.O. Box 4735 Lancaster, CA 93539 / (661) 948-5644	12/17/16	17
70238	CUP 07-19	14.3± gr ac RPD community with 155 individual detached airspace condos with 1.9 acres of common open space; NE corner of 50th St W and Lancaster Blvd	MDR	Westside	Judysco, Inc. & Lancaster, LLC 802 E Ave J, Lancaster, CA 93535 (310) 901-0670	7/20/15	155
70861		6.23± gr ac SFR/MFR subdivision; south of Ave I from Beech to Elm	CPD HDR	Lancaster	Lancaster Redevelopment Agency 44933 Fern Ave, Lancaster CA 93534	11/21/15	7
71563	CUP 11-09 GPA 11-03 ZC 11-03	28± gr ac SFR subdivision and RPD; NW corner of 60th St W and Ave J	R-7000	Westside	Pacific Communities (Corinna Ocampo) 1000 Dove St, Newport Beach, CA 92660 (949) 660-8988 ext. 172	4/15/15	68
72565		10± gr ac SFR subdivision; SW corner of 65th St W and Ave J-8	R-7000	Westside	Del Sur Ranch, LLC, 16633 Ventura Bl, Ste 1330 Encino, CA 91436 / (818) 986-8890	5/19/16	36
72875	CUP 14-08 TTM 60933	10.15± gr ac SFR residential planned development; NE corner of 25th St E and Ave J-8	R-7000	Eastside	Bruno Barbieri, 2121 Palomar Airport Rd #160 Carlsbad, CA 92011 / (760) 213-0277	9/22/16	65
152 approved tentative tract maps							12,995