ATMOSPHERIC DYNAMICS, INC
Meteorological & Air Quality Modeling

May 12, 2017

Ms. Lisa Beckham
EPA Region 9
Mail Code: AIR-3
75 Hawthorne Street
San Francisco, CA 94015

Re: Palmdale Energy Project Prevention of Significant Deterioration Permit Response to Comments

Dear Ms. Beckham:

In response to the December 5th, 2016 U.S. Environmental Protection Agency Region 9 (EPA Region 9) email regarding the assessments of the Best Available Control Technology (BACT) for carbon monoxide and greenhouse gas, please find the enclosed responses.

Best Available Control Technology Analysis

CO BACT for Combustion Turbines

EPA Question

The CO BACT analysis provided in the application eliminates CO limits below 2.0 ppm as BACT based on the additional cost associated to achieve lower limits using an oxidation cost. In order for EPA to make a case-by-case BACT determination, please provide a cost analysis specific to this project to demonstrate your determination that it is no cost effective. Please be sure to include the total annualized cost per ton to removed CO and not only the incremental cost of achieving additional reductions.

Response:

Use of a CO oxidation catalyst is a proven control technology. There are literally hundreds of projects across the country that have proposed and installed CO catalyst systems in various sizes and configurations. The applicant is not aware of any data for a combined cycle facility such as PEP that would indicate that a CO catalyst system is not cost effective. Cost values for newer turbines can be higher as compared to older turbines which were constructed with older versions of CO catalysts, since the uncontrolled floor is now at 9 ppm instead of older values in the range of 12-15 ppm (for natural gas). The applicant has estimated the control cost effectiveness (on a per turbine basis) for CO using the standard EPA cost analysis procedures and assuming a 2017 cost basis. The cost effectiveness for CO of the proposed CO catalyst system, assuming the reduction is from 9 to 2 ppm is $3,600/ton of CO removed as summarized in Table R-1. This value is reasonable and well within the cost range of other similar facilities.

Table R-5 PEP Plant Performance Metrics

85 Deg. 20 % RH	Plant Output (Net) MWhrs	CO2 Production (lbs/hour)	Notes
Base Load, Evap Cooling On, No Duct Firing	657	530,016	
Base Load, Evap Cooling On, Full Duct Firing	704	577,928	MWs & CO2 production with Ductfiring
75% Load, No Evap Cooling, No Duct firing	474	394,328	
Plant Minimum Load, No Evap Cooling, No Duct Firing	159	143,777	317,500 MWs for Minimum load - 2 units. This reflects one unit at minimum load. CO2 production is 143,777 lbs per hour for a single unit in operation.
Other Relevant Performance Information			
Average Annual Site Conditions (64 Deg F), Base Load, Evap Cooling on, No Duct Firing	656	531,846	
Average Annual Site Conditions (64 Deg F), 75% Load, Evap Cooling Off, No Duct Firing	498	207,265	Part load operation
98 Deg F, Base Load, Evap Cooling on, Duct Firing	677	565,112	

Table R-6 Operating Case 1

Case 1	MWHours	CO2 Production (lbs)	Notes
5 Cold Starts, 35 Warm Starts, 40 Shutdowns, 6460 Hours No Ductfiring, 1500 Hours with Ductfiring, 40 hours in SU/SD			
64 hours in Startup	Not Included	Not Included	
68 Hours of bringing Combined Cycle into operation	33,871	14,094,020	Using an average MWs and CO2 production (75% Point @ 64 Deg F) for the startup time - 1.5 hours. Reduce Operating hours w/o DF appropriately. 5 x 3 hours + 35 x 1.5 hours = 68 hours
Hours of Part Load Operation - Minimum	0	0	
6392 hours of operation w/o duct firing	4,195,070	3,399,559,632	6460 - 68 = 6392 hours of base load operation. Temp of 64 Deg F - Average annual temp
1500 hours of duct firing	1,015,650	847,668,000	Temp of 98 Deg F for duct firing
Totals	**5,244,590**	**4,261,321,652**	
Average Annual CO2 Production Value	**813**		
30 year degradation @6%	**864**		