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Description:	N/A
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ATMOSPHERIC DYNAMICS, INC
Meteorological & Air Quality Modeling

October 20, 2018

Mr. Andrew Lee
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, CA 91765

Subject: MGS (Facility ID# 155474) Response Package to the SCAQMD September 26th Comment Letter

Dear Mr. Lee;

Malburg Generating Station (MGS) has provided the attached response package to your September 26th, 2018 information request. As summarized below, we have responded to all of the questions. Additionally, there are several attachments and modeling files associated with the responses.

Response 4.a.iii: No comments.

Response 4.c.iii through 4.c.dd – 2nd Paragraph – Yes, the ratio of present versus upgraded turbine fuel use on an hourly basis if 1.07, i.e., 0.563/0.526, but this is not how the AQMD has in the past calculated the monthly fuel use limit. In each and every instance beginning with the initial 2002 engineering analysis up to the SOB for the Title 5 permit, the AQMD has calculated the monthly fuel limit based upon the number of PM10 offsets provided. This methodology is shown in the 2002 analysis, and it is re-stated in bold print in the 2013 amendment analysis dated 4/12/13, page 27.

Secondly, the letter cited from Ms. Carter at Siemens dated 2/9/18 is simply a statement addressing the fuel use increase on an hourly basis from the turbine and does not address the addition of the duct burner fuel use. Her comment has nothing to do with and should not be the basis for the calculation of the monthly fuel limit as noted above. Additionally, Table 2 in the application lists the proposed fuel increase to 405.24 mmscf/month which is for both the turbine upgrade (347.8 mmscf) plus the duct burner (57.456 mmscf).

4th paragraph – the PM10 emissions limit is not being lowered to a level of 2.366 lbs/hr. The AQMD accepted PM10 mass limit is 3.386 lbs/hr based upon data provided in a follow-up response supported by Mr. Matt McCune of Montrose Environmental Services, as well as an extensive table of source test values on similar turbines. Therefore, the AQMD should include condition C 1.4 and base it on the quantity of offsets credited to the facility.

Table 1 attached presents data which shows the historical method used by the AQMD to calculate the monthly fuel limit for each turbine based upon the PM10 offsets credited to the facility. Data for the table was extracted from the various engineering analyses performed by the AQMD for the years 2002, 2013, and 2015. Data derived from the turbine upgrade application is also presented, and the monthly fuel limit is calculated the exact same way as previously done by the AQMD. The table shows that the monthly fuel limit can be increased to a level of 405 mmscf/mo/turbine while maintaining compliance with the permit PM10 limit of 2438 lbs/month/turbine. The table also shows the revised PM10 emissions factor accepted by the AQMD, as well as a revision to the controlled PM10 emissions factor in units of lbs/mmscf. This data confirms the fuel use calculations presented in an earlier response.

5th paragraph and items 4.aa through 4.dd – SO_2 emissions versus fuel use increases. The current SO_2 monthly limit for both turbine power trains is 214 lbs. The current fuel use limit for each power train is 330 mmscf, for a total of 660 mmscf/month. The current permit states an emissions limit of 0.281 lbs/mmscf. The emission factor was derived in the SCAQMD calculations as:

1. AP-42 factor for SO_2 of 0.6 lbs/mmscf
2. Adjusted this factor for the fuel heat rating of 1018: (1018/1020) x 0.6 = 0.5988 lbs/mmscf
3. The AP-42 factor is based on a gas S content of 2000 grs/10^6 scf, which equals 0.2 grs/100 scf, which equals 3.2 ppm in the gas.
4. 53% conversion of SO_2 to SO_3 leaves 47% or 0.47
5. 0.47 x 0.5988 = 0.281 or 0.28 lbs/mmscf which is the SO_2 factor in the permit.

The application for the turbine upgrade used the same emission factor but with the new fuel use of:

- 0.48306 mmscf/hr (gas turbine Case S9)
- 0.07976 mmscf/hr (duct burner at max 81.2 mmbtu/hr rating)
- 0.56283 mmscf/hr (gas turbine (S13) + duct burner)

Using the SO_2 emission factor of 0.281 lb/mmscf, we get:

- Gas turbine no duct burner for S9 = 0.14 lb/hr
- Gas turbine with duct burner for S13 = 0.16 lb/hr

These are then used to calculate the lbs/month limits utilizing the following assumptions which is consistent with SCAQMD methodology used in the current permit:

1. 720 hrs per month = 30 days.
2. 5 cold starts per month, 5 non-cold starts per month, and 10 SD per month.
3. All remaining hours are at steady state operation conditions per Case S13 = 697.5 hour.

4. Total monthly SO_2 is 113.32 lbs/month per turbine or 226.644 lbs/month both turbines (rounded to 227 lbs/month both turbines).
5. Annual SO2 is 1.40 tpy for both turbines or a 0.12 tpy increase.

To calculate the new monthly fuel limit,

227 lbs/month/2 turbine) (mmscf/0.28 lb) = 405.4 scf per turbine

A couple of notes on the proposed increase:

1. Neither the present SO_2 emissions, or the SO_2 emissions at a fuel rate of 405 mmscf/mo/turbine would trigger NSR offsets, as both levels are well below the AQMD offset trigger level of 4 tpy.
2. SO_2 BACT for the proposed increase would not change from the present BACT determination, i.e., use of PUC grade pipeline natural gas.
3. The added small increase in SO_2 emissions will have no effect on the facility acid rain permit. Notifications of the small increase will be forwarded to EPA (Acid Rain Program division), and any increase in allowances that are needed to cover the increase will be acquired by MGS as part of its normal allowance acquisition process.

MGS confirms the increase on the monthly fuel limit up to 405 mmscf/month per turbine.

The proposed increase in fuel use based on the upgraded turbines requires an increase in the monthly fuel limits, as summarized in the application package.

Response 6.a: The Rule 222 form for the cooling tower as well as a form 400-A, CEQA form, and form 400-PS were provided in the May 2018 response submittal. They are included with this response package.

Response 6.b.iii: The TDS value of 1125 mg/l used in the previous analysis was in error. The correct value is 1020 mg/l. The cooling tower emissions calculations have been updated. In addition, the annual average TDS value has been revised from 4500 to 4080 based on 4 cycles of concentration. Based on the use of 1020 mg/L, the PM10 emissions will slightly decrease from a previous October 2017 application from 1.327 tpy down to 1.203 tpy.

Response 6.d.i: The cooling tower HAP/toxics emissions were included in the revised HRA dated 5-2-18. The HAP emissions remain the same, i.e., the above noted change in TDS did not affect HAP emissions since the circulation rate in gallons per minute for the application as well as the updated analysis both relied upon the new circulation rate as provided by the applicant, and the HAPs concentrations were those derived from the latest water analysis. The HRA files have been previously supplied to the AQMD. As a note, the TDS increase from 1020 up to 1125 mg/l was the cause for the PM increase. The water circulation did not change. As the cooling tower HAP emissions are directly tied to the drift rate, which is solely a function of the water circulation rate of 26,927.4 gpm, the HAP emissions will not change and no update to the May 2018 HRA is required. The daily PM emissions are 6.6 lbs/day.

Response 8.d.ii.aa: The basis for the emission rates referenced in aa-dd was the use of the startup emissions of 61.4 lbs/hr for NOx and 102.4 lbs/hr for CO which were higher than the anticipated commissioning emissions that were quantified as part of the variance. The use of this data was prior to the May 2018 comments provided by the SCAQMD where the district wanted revised CO and NOx startup emissions on a pound per hour basis. The following table presents the updated emissions used to model the commissioning activities associated with the upgrade package. As before, the maximum 1-hour commissioning emissions would occur for NOx and CO during a cold start event as the emissions of NOx and CO during the non-start hours would be less than startup. The maximum hourly startup emissions are based on district recommended numbers. For the 8-hour event, the very conservative commissioning emissions are based on the following:

Two non-cold starts at 119.8 lbs total based on permit limits

Two shutdowns at 100 lbs total based on expected commissioning emissions

7.5 hours of commissioning emissions at 100 lbs/hr for 750 lbs total

119.8 lbs + 100 lbs + 750 lbs = 969.8 lbs or 121.225 lbs/hr

AERMOD for New Commissioning Emissions & Compton Met	***1-hour CO Commissioning***	***8-hour CO Commissioning***	***1-hour NO_x Commissioning***
Turbines 1 & 2 (lbs/hr/turbine)	203.13	121.225	102.4
Turbines 1 & 2 (g/s/turbine)	25.5944	15.274	12.902
Modeled (µg/m^3)	142.57	53.10	71.69
Background (µg/m^3)	6,871	4,466	138.5
Maximum Impact	7,013.6	4,519.1	195.9*

* Modeled concentration of 71.69 *u*g/m^3 was adjusted to 57.35 using ARM2 (0.8)

The DVD mailed on 5/29/18 does not contain the commissioning files. An updated DVD will be submitted based on the results in the table above.

Response 9.a.i: For the HRA, Scenario S15 (100 percent load at 65^{o}F) was used to represent the stack parameters for both the 1-hour acute and annual chronic and cancer impact analyses. However, to calculate the emissions for the maximum hourly scenario, S13 (38^{o}F 100 percent load) was used.

Response 9.a.ii: The basis for selecting annual average temperature Scenario S15 (100 percent load) for both the emissions (fuel use) and stack parameters is based on the long-term exposure (30 year) requirements for the chronic and cancer impact analyses. Scenario S13 was to calculate the maximum hourly emissions but Scenario S15 was used to model the 1-hour acute impacts as

the overall acute analyses from natural gas turbines is often several orders of magnitude less than the acute significance level of 1.0.

Response 9.b.II: The annual fuel use is based on Scenarios S11 and S15. Please note that Scenario S9 in Attachment 3, Table 3 was not used to derive the annual fuel use limits. Also note that the limit is 4772.68 mmscf/yr per turbine and not 4774.81 mmscf/yr turbine. The turbine fuel use calculations are included in Table 4 as an attachment.

Operation of the duct burner (rated at 81.2 MMBtu/hr) will only occur as needed to supply additional steam for power generation. It will not be used during any type of start event (cold, warm or hot) to avoid thermal shock to the boiler tubes in the HRSG. Once the turbines are safely started and up to temperature, and if the need demands, then duct firing will be utilized.

Response 9.c.iii: The risk summary, by turbine, was provided in the May 2018 submittal as an attachment (Table 2). The risk summary for the cooling tower is provided in Table 3 which is attached at the end of this response package.

Response 13.a.i: The values used in the previous emissions analysis are the CARB values as specified in CCR Title 17, Subchapter 10, Article 2, Section 95101, Table 2.

Response 13.a.ii: The GHG emissions estimates have been revised to reflect the use of the federal GWP values per 40 CFR 98 and are included as an attachment to this response.

Response 13.b: There are no circuit breakers that utilize SF6 or any other GHG compounds.

Response 15.a: As noted in the AERSCREEN User's Guide (EPA-454/B-16-004, December 2016, pp.33,57), the minimum distance from the source to the nearest shoreline must be less than 3000 meters for shoreline fumigation impacts to be calculated. Since these criteria is not met for MGS, shoreline fumigation impacts were not calculated.

Response 15.b.i: Fumigation analyses with the EPA Model AERSCREEN (version 16216) were conducted for inversion breakup conditions based on EPA guidance given in EPA-454/R-92-019 (EPA, 1992). The annual average stack parameters (Scenario S14 for 100 percent load at 59°F) were modeled. Shoreline fumigation impacts were not assessed since the nearest distance to the shoreline of any large bodies of water is greater than 3 kilometers. Since AERSCREEN is a single point source model, only one of the two turbine stacks were modeled. Other AERSCREEN inputs were the BPIP-PRIME values used for the facility analyses for the eastern turbine stack, the AERSURFACE values used by the SCAQMD for generating the Colton meteorological data (i.e., 0.18 noontime surface albedo, 0.543 meter surface roughness, and 1.37 Bowen ratio), the range of ambient temperatures analyses in the facility screening analyses (38 to 94°F), a minimum fenceline distance, URBAN dispersion conditions (fumigation results default to RURAL dispersion), no flagpole receptors, a minimum wind speed of 0.5 m/s with a 10-meter anemometer height, and flat terrain. Impacts were initially evaluated for unitized emission rates (1.0 g/s).

If fumigation impacts exceed AERSCREEN 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. For the MGS fumigation analysis, AERSCREEN determined that there were no meteorological conditions fitting the inversion breakup criteria. Therefore, no fumigation impacts were calculated to occur.

Response 15.b.ii: No inversion breakup fumigation is expected to occur.

Response 15.c: A zip file containing the AERSCREEN analysis for the fumigation assessment will be submitted on DVD.

Response 15.d: For the MGS fumigation analysis, AERSCREEN determined that there were no meteorological conditions fitting the inversion breakup criteria. Therefore, no fumigation impacts were calculated to occur. All of the fumigation impacts are less than the AERSCREEN maxima predicted to occur under normal dispersion conditions anywhere offsite. Since fumigation impacts are less than the maximum overall AERSCREEN impacts, no further analysis of additional short-term averaging times is required as described in Section 4.5.3 of EPA-454/R-92-019 (EPA, 1992a).

Response 16: The revised form 500-A2 Title V Application Certification is attached.

Copies of this submittal will be sent to the California Energy Commission. Please feel free to contact me at (831) 620-0481 if you have any questions concerning our response to your September comments.

Regards,

Atmospheric Dynamics, Inc.

Gregory Darvin

Cc

Kyle McCormack, MGS

Scott Galati, Dayzen, LLC

Attachments

The following signed cooling tower forms are included as a separate attachment:

- Form 222-CT
- Form 400-A
- Form 400 -CEQA
- Form 400-PS

Table 1 Malburg Info-Chrono				All data is on a per turbine/duct burner basis.										
Nat Gas, btu/scf:		1018									PM10 (2)	PM10	Max Fuel	
				GT + DB	GT + DB	PM10 EF (1)	GT + DB	GT + DB	PM10	PM10 (3)	Req'd	provided	vs. PM10	
	GT cold	GT ISO	DB	cold	ISO	Control'd	Cold	ISO	Cold	ISO	offsets	offsets	offsets	AQMD
	mmbtu/hr	mmbtu/hr	mmbtu/hr	mmbtu/hr	mmbtu/hr	lbs/mmscf	mmscf/hr	mmscf/hr	lbs/hr	lbs/hr	lbs/mo	lbs/mo	mmscf/mo	Analysis
2002	461.87	447.22	73.4	535.27	520.62	7.397	0.526	0.511	3.89	3.78	2784	2438	330	ATC/PTO
2013	454.05	439.8	81.2	535.25	521	7.397	0.526	0.512	3.89	3.79	2800.8	2438	330	Amend
2015	454.05	439.4	81.2	535.25	520.6	7.397	0.526	0.511	3.89	3.78	2800.8	2438	330	T5
Upgrade														
2017/2018	491.76	474.61	81.2	572.96	555.81	6.014	0.563	0.546	3.386	3.285	NA	2438	405	Upgrade
						Old vs New							Old vs New	
						1.22996							1.22996	
(1) PM10 EF controlled accounts for SO2 to SO3 conversion														
(2) normal ops plus SU and SD														
(3) the AQMD always uses the cold day to calculate the total req/d offsets, and the ISO day to calculate the monthly fuel limit based on the PM10 offsets provided.														
(4) The AQMD derived the 7.397 value as follows:														
Using the AP-42 PM10 emissions factor and adding in the SO2 to SO3 conversion rate of 53%, they arrive at a controlled factor of 7.397 lbs/mmscf														
From the previous analyses the 7.397 value is derived by taking the PM10 lb/hr emission rate and dividing it by the hourly mmscf value														
(Because the numbers are rounded the derivation of the exact value of 7.397 is not achieved.)														
(5) For the Malburg upgrade, the proposed and accepted PM10 emission rate value for the cold case was 3.386 lbs/hr.														
3.386 lb/hr divided by the cold case heat rate of 572.96 results in an emission rate of 0.00591 lbs/mmbtu														
ISO case (65F), 0.00591 times the ISO heat rate of 555.81 mmbtu/hr results in a mass emissions rate of 3.285 lbs/hr.														
(6) In the past AQMD analyses, they have used the cold day to calculate the total offsets (normal ops + SU + SD), and														
the ISO (65F) day to calculate the monthly fuel limit.														
(7) Using the lbs/hr values for both cold and ISO days, divided by the cold and ISO mmscf/hr values results on revised emissions factor of ~ 6.014 lbs/mmscf.														
(8) The req'd PM10 offsets need not be calculated for the upgrade because the applicant is not proposing to change the current permit limit value of 2438 lbs PM10/month.														
(9) Therefore, calculating the new monthly fuel limit, using the same method used by the AQMD in previous analyses, results in the revised upgrade value shown above.														

Table 2 Revised Cooling Tower PM10 Emissions Calculations					
Scenario or Project ID:	Malburg				
Cooling Tower/Wet SAC Particulate Emissions			**Tower Physical Data (optional)**		
# of Identical Towers:	1		# of Fans:	3	
# of Cells:	3		Fan ACFM:	750000	
Operational Schedule: Hrs/day	24		Fan Diam (ft):	22 ft	6.7056 m
Days/Year	365		Exit Vel (ft/sec	32.9 ft/sec	10.028 m/s
Hrs/Year	8760		Length (ft)	113.94 ft	34.73 m
Pumping rate of recirculation pumps (gal/min)	26927.4		Width (ft)	37.34 ft	11.38 m
Flow of cooling water (lbs/hr)	13464777.1		Deck Ht (ft)	35.042 ft	10.68 m
TDS from water analysis: (mg/l or ppmw)	1020.0		Fan Ht (ft)	45.042 ft	13.73 m
Cycles of Concentration:	4.0				
Avg TDS of circ water (mg/l or ppmw)	4080.0	annual avg value			
Flow of dissolved solids (lbs/hr)	54936.29				
Fraction of flow producing drift*	1.00	1= worst case			
Control efficiency of drift eliminators, %	0.0005	0.000005			
Calculated drift rate (lbs water/hr)		67.32	1615.773252	Calc lbs/day	
	Per Tower	**Per Cell**	**All Towers**		
PM10 emissions (lbs/hr)	**0.275**	**0.092**	**0.275**		
PM10 emissions (lbs/day)	**6.592**	**2.197**	**6.592**		
PM10 emissions (tpy)	**1.203**	**0.401**	**1.203**		
PM2.5 fraction of PM10	1.00	1= worst case			
PM2.5 emissions (lbs/hr)	**0.275**	**0.092**	**0.275**		
PM2.5 emissions (lbs/day)	**6.592**	**2.197**	**6.592**		
PM2.5 emissions (tpy)	**1.203**	**0.401**	**1.203**		
Notes:					
Based on Method AP 42, Section 13.4, Jan 1995					
*Technical Report EPA-600-7-79-251a, Page 63					
Effects of Pathogenic and Toxic Materials Transported Via Cooling Device Drift - Volume 1.					

Table 3 Health Risk Values by Cell for the Cooling Tower														
Modeling	Receptor ID	Receptor	Receptor		Cell 1				Cell 2				Cell 3	
Receptor #	#	Type	Sub_ID		Cancer Risk	Chronic HI	Acute HI		Cancer Risk	Chronic HI	Acute HI		Cancer Risk	Chronic HI	Acute HI
8029	1	Residences	SSW		1.90E-10	2.15E-05	5.93E-07		1.90E-10	2.15E-05	3.69E-07		1.90E-10	2.15E-05	3.89E-07
8030	2		S		1.19E-10	1.34E-05	2.50E-07		1.19E-10	1.35E-05	3.31E-07		1.20E-10	1.35E-05	3.34E-07
8031	3		ESE		1.48E-10	1.67E-05	1.88E-07		1.49E-10	1.68E-05	1.89E-07		1.50E-10	1.69E-05	1.89E-07
8032	4		NE		5.55E-11	6.27E-06	1.05E-07		5.54E-11	6.26E-06	1.05E-07		5.52E-11	6.24E-06	1.05E-07
8033	5		NNE		5.66E-11	6.40E-06	1.23E-07		5.67E-11	6.41E-06	1.24E-07		5.67E-11	6.41E-06	1.25E-07
8034	6		N		5.69E-11	6.43E-06	9.64E-08		5.69E-11	6.43E-06	9.70E-08		5.69E-11	6.43E-06	9.76E-08
8035	7		NW		5.71E-11	6.46E-06	1.05E-07		5.69E-11	6.43E-06	1.05E-07		5.67E-11	6.41E-06	1.05E-07
8036	8		W		6.22E-11	7.04E-06	7.71E-08		6.20E-11	7.01E-06	7.76E-08		6.18E-11	6.99E-06	7.81E-08
8037	9		SW		6.09E-11	6.89E-06	7.86E-08		6.08E-11	6.87E-06	7.84E-08		6.06E-11	6.85E-06	7.82E-08
8038	10	Worker	N		6.87E-10	7.77E-05	1.10E-06		6.90E-10	7.80E-05	1.10E-06		6.91E-10	7.81E-05	1.14E-06
8039	11		E		1.13E-09	1.28E-04	2.17E-06		1.16E-09	1.32E-04	2.20E-06		1.19E-09	1.35E-04	1.93E-06
8040	12		S		4.26E-10	4.82E-05	3.35E-06		4.51E-10	5.10E-05	3.35E-06		4.84E-10	5.47E-05	3.47E-06
8041	13		W		4.94E-10	5.58E-05	1.05E-06		4.89E-10	5.53E-05	1.08E-06		4.82E-10	5.45E-05	1.08E-06
8042	14		NE		7.81E-10	8.83E-05	1.27E-06		7.58E-10	8.58E-05	1.41E-06		7.56E-10	8.55E-05	1.54E-06
8043	15		NW		5.31E-10	6.01E-05	1.19E-06		5.11E-10	5.78E-05	1.15E-06		4.90E-10	5.55E-05	1.11E-06
8044	16		SW		2.59E-10	2.93E-05	6.81E-07		2.56E-10	2.90E-05	1.72E-06		2.55E-10	2.89E-05	1.83E-06
8045	17		SE		4.03E-10	4.55E-05	5.67E-07		4.15E-10	4.69E-05	5.85E-07		4.28E-10	4.84E-05	6.04E-07

Table 4																
Maximum Hourly, Daily, and Annual Emissions Calculations									Number of Identical Engines			2				
Case #:	AVG Ops Scenario									Turbine Model:		SGT-800 upgrade				
Input data per unit:			Avg	Avg	Avg	Cold	Warm	Hot						Max		
	Max	Max	# of Cold	# of Warm	# of Hot	Startup	Startup	Startup	Shutdown	Cold	Warm	Hot	Estimated	Estimated		
	Operation	Annual	Startups	Startups	Startups	Time	Time	Time	Time	Starts	Starts	Starts	Shutdowns	Shutdowns		
	hrs/day	Op hrs	day	day	day	hrs	hrs	hrs	hrs	events/yr	events/yr	events/yr	yr	day		
	24	8760	1	1	0	2	1.5	1	0.5	30	26	0	56	2		
	Cold	Warm	Hot		Steady State		Worst Hr		Total SU/SD Time			Annual				
	Startup	Startup	Startup	Shutdown	Emissions	Emissions	Emissions	Cold	Warm	Hot	Shutdown	Steady State	Total Annual Emissions- SU/SDs			
	Emissions	Emissions	Emissions	Emissions	w/o DB	w/DB	w/DB	Start	Start	Start		Non SU/SD	Cold SU	Warm SU	Hot SU	Shutdowns
	lbs/event	lbs/event	lbs/event	lbs/event	lbs/hr	lbs/hr	lbs/hr	hrs/yr	hrs/yr	hrs/yr	hrs/yr	hrs/yr	lbs/yr	lbs/yr	lbs/yr	lbs/yr
					Case S11	***Case S15***	***Case S13***									
NOx	122.80	51.30	51.30	4.50	3.46	4.08	4.16	60	39	0	28	8633	3684.0	1333.8	0.00	252.0
CO	204.80	59.90	59.90	10.80	2.11	2.48	2.53			Total SU-SD Hours/Yr:		127	6144.0	1557.4	0.00	604.8
VOC	1.75	1.55	1.55	0.71	0.72	0.85	0.87				Steady State Hour Breakdown		52.5	40.3	0.00	39.8
SOx	0.28	0.21	0.14	0.07	0.13	0.15	0.16					Hrs/yr	8.3	5.4	0.00	3.9
PM10	3.46	2.60	1.73	0.87	1.69	2.28	2.35		Duct burner firing, max hours/yr:			8633	103.8	67.6	0.00	48.7
PM2.5	3.46	2.60	1.73	0.87	1.69	2.28	2.35		Non-duct burner firing, hours/yr:			0	103.8	67.6	0.00	48.7
NH3	0.00	0.00	0.00	0.00	3.32	3.89	4.01						0.0	0.0	0.00	0.0
Notes:					65F	65F	38 F									
Cold start plus shutdown =			2.5	hrs					**Annual Fuel Use Values**		mmbtu/hr	hrs/yr*		mmbtu/yr		
Warm start plus shutdown =			2	hrs					SU/SD Case S11 w/o DB		474.61	127		60275.47		
Hot start plus shutdown =			1.5	hrs					Case S11 w/o DB		474.61	0		0		
Shut down =			0.5	hrs					Case S15 w/DB		555.81	8633		4798307.73		
													Per GT/DB	4858583.2	mmbtu/yr	
Maximum Estimated Annual Emissions													Per GT/DB	4772.68	mmscf/yr	
				NOx	CO	VOC	SOx	PM10	PM2.5	NH3						
Ops Scenario				lbs/yr	lbs/yr	lbs/yr	lbs/yr	lbs/yr	lbs/yr	lbs/yr		Total All GTs/DBs =		9545.35	mmscf/yr	
Cold Startups				3684.0	6144.0	52.5	8.3	103.8	103.8							
Warm Startups				1333.8	1557.4	40.3	5.4	67.6	67.6							
Hot Startups				0.0	0.0	0.0	0.0	0.0	0.0							
Shutdowns				252.0	604.8	39.8	3.9	48.7	48.7							
Steady State w/o DB				0.0	0.0	0.0	0.0	0.0	0.0	0.0						
Steady State w/DB				35222.6	21409.8	7338.1	1295.0	19683.2	19683.2	33582.4						
		1 Turbine Total, lbs/yr:		*40492.4*	*29716.0*	*7470.6*	*1312.5*	*19903.4*	*19903.4*	*33582.4*						
		1 Turbine Total, tons/yr:		20.25	14.86	3.74	0.66	9.95	9.95	16.79						
				NOx*	CO	VOC	SOx	PM10	PM2.5	NH3						
				tpy	tpy	tpy	tpy	tpy	tpy	tpy						
Total Tons/Yr All Units:				**40.49**	**29.72**	**7.47**	**1.31**	**19.90**	**19.90**	**33.58**						
Existing Facility PTE: (see note 4)				39.4	45.81	19.42	1.284	29.25	29.25							
Emissions Difference: (increases versus decreases)				1.09	-16.09	-11.95	0.03	-9.35	-9.35							
SCAQMD	Air Agency Offset Trigger Levels, TPY:			4	29	4	4	4	4							

GHG Emissions Estimates										
Fuel:	Natural Gas				short			CO2e		
Btu/scf:	1018	HHV	*Emissions*	lbs/yr	tons/yr		IPCC SAR	short		
Heat Rate:	4858583.2	mmbtu/yr		5.68E+08	2.84E+05		Values	tons/yr		
Fuel Rate:	4772.6750	mmscf/yr		1.07E+04	5.36E+00		1	2.84E+05		
Emissions Factors				1.07E+03	5.36E-01		25	1.34E+02		
CO2	116.89	lbs/mmbtu					298	1.60E+02		
CH4	0.002205	lbs/mmbtu					Total CO2e:	284,253	short TPY	1 Engine
N2O	0.0002205	lbs/mmbtu					Total CO2e:	568,507	short TPY	All Engines
							Total CO2e:	258,412	metric TPY	1 Engine
Emissions Factors for GHG, 40 CFR 98, Subpart C, Tables C-1, C-2.							**Total CO2e:**	**516,824**	**metric TPY**	All Engines
1 short ton = 2000 lbs, 1 metric ton = 2200 lbs.										

South Coast Air Quality Management District

Form 222-CT
Registration for Industrial Cooling Towers

Complete one form per equipment.

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

1. Facility Name (Business Name of Operator):
Bicent (California) Malburg, LLC

2. Valid AQMD Facility ID
(Leave blank if a new business):
155474

3. Owner's Business Name (If different from Business Name of Operator): ☐ Check here if change of operator

Section B - Equipment Location Address

4. Equipment Location Is:

4963 Soto St.
Street Address

Vernon , CA 90058
City Zip

Kyle McCormack — Environmental Manager
Contact Name Title

303 442 5590
Phone # Ext. Fax #

E-Mail: kmccormack@heorotpower.com

Section C - Business Mailing Address

5. Correspondence Information:
☑ Check here if same as equipment location address

Address

, State Zip
City

Contact Name Title

Phone # Ext. Fax #

E-Mail:

Section D - Equipment Information

Rule 222(c)(17) INDUSTRIAL COOLING TOWER means a cooling tower located at a chemical plant, refinery or other industrial facility that is not used for comfort cooling. *(Amended May 5, 2017)*

6.

Cooling Tower ID: CT #1

Cooling Tower Type: ☑ Counterflow ☐ Crossflow ☐ Other _____

Water Circulation Rate: Max 26952.4 gpm Average 26952.4 gpm

Average Total Dissolved Solids (TDS) in the recirculating or blowdown water (part per million or mg/L): 1125

Water Source: ☐ City ☐ Reclaimed/Treated ☐ Other Sources: _____

Year of Construction/Installation: _____

Drift Eliminator:

Type: _____ Material: _____ Number of passes: _____

Has this ever been retrofitted? ☑ No ☐ Yes If Yes, When _____

Fees are updated on July 1 of each year.

For current fees, please see Rule 301 or go to http://www.aqmd.gov/home/permits/equipment-registration/rule-222-filing-program

Section E - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

7. Signature of Responsible Official: D. Halliday

8. Title of Responsible Official: Chief Operating Officer

9. Print Name: Douglas Halliday

10. Date: 5/2/2018

11. Check List: ☑ Authorized Signature/Date ☑ Fees Enclosed

AQMD USE ONLY	APPLICATION TRACKING #		EQUIPMENT CATEGORY CODE:	FEE $		VALIDATION
DATE A R	ENG.A R DATE	CLASS I III	ASSIGNMENT Unit Engineer	CHECK/MONEY ORDER #	AMOUNT $	TRACKING #

South Coast Air Quality Management District

Form 400-A

Application Form for Permit or Plan Approval

List only one piece of equipment or process per form.

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

1. Facility Name (Business Name of Operator to Appear on the Permit):
Bicent (California) Malburg, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD):
155474

3. Owner's Business Name (If different from Business Name of Operator):

Section B - Equipment Location Address

4. Equipment Location Is: (●) Fixed Location ( ) Various Location
(For equipment operated at various locations, provide address of initial site.)

4963 Soto Street
Street Address

Vernon , CA 90058
City Zip

Kyle McCormack Environmental Manager
Contact Name Title

(303) 442-5590 Ext. Fax #
Phone #

E-Mail: kmccormack@heorotpower.com

Section C - Permit Mailing Address

5. Permit and Correspondence Information:
[X] Check here if same as equipment location address

4963 Soto Street
Address

Vernon , CA 90058
City State Zip

Kyle McCormack Environmental Manager
Contact Name Title

(303) 442-5590 Ext. Fax #
Phone #

E-Mail: kmccormack@heorotpower.com

Section D - Application Type

6. The Facility Is: ( ) Not In RECLAIM or Title V ( ) In RECLAIM ( ) In Title V (●) In RECLAIM & Title V Programs

7. Reason for Submitting Application (Select only ONE):

7a. New Equipment or Process Application:

- ( ) New Construction (Permit to Construct)
- ( ) Equipment On-Site But Not Constructed or Operational
- ( ) Equipment Operating Without A Permit *
- ( ) Compliance Plan
- (●) Registration/Certification
- ( ) Streamlined Standard Permit

7b. Facility Permits:

- ( ) Title V Application or Amendment (Refer to Title V Matrix)
- ( ) RECLAIM Facility Permit Amendment

7c. Equipment or Process with an Existing/Previous Application or Permit:

- ( ) Administrative Change
- ( ) Alteration/Modification
- ( ) Alteration/Modification without Prior Approval *
- ( ) Change of Condition
- ( ) Change of Condition without Prior Approval *
- ( ) Change of Location
- ( ) Change of Location without Prior Approval *
- ( ) Equipment Operating with an Expired/Inactive Permit *

Existing or Previous Permit/Application
If you checked any of the items in 7c., you MUST provide an existing Permit or Application Number:

* A Higher Permit Processing Fee and additional Annual Operating Fees (up to 3 full years) may apply (Rule 301(c)(1)(D)(i)).

8a. Estimated Start Date of Construction (mm/dd/yyyy):

8b. Estimated End Date of Construction (mm/dd/yyyy):

8c. Estimated Start Date of Operation (mm/dd/yyyy):

9. Description of Equipment or Reason for Compliance Plan (list applicable rule):
Rule 219 Exempt Cooling Tower Registration

10. For Identical equipment, how many additional applications are being submitted with this application?
(Form 400-A required for each equipment / process)

11. Are you a Small Business as per AQMD's Rule 102 definition?
(10 employees or less and total gross receipts are $500,000 or less OR a not-for-profit training center) (●) No ( ) Yes

12. Has a Notice of Violation (NOV) or a Notice to Comply (NC) been issued for this equipment? (●) No ( ) Yes
If Yes, provide NOV/NC#:

Section E - Facility Business Information

13. What type of business is being conducted at this equipment location?
Electric Power Generation

14. What is your business primary NAICS Code?
(North American Industrial Classification System) 221112

15. Are there other facilities in the SCAQMD jurisdiction operated by the same operator? (●) No ( ) Yes

16. Are there any schools (K-12) within 1000 feet of the facility property line? (●) No ( ) Yes

Section F - Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

17. Signature of Responsible Official:
D. Halliday

18. Title of Responsible Official:
Chief Operating Officer

19. I wish to review the permit prior to issuance.
(This may cause a delay in the application process.) ( ) No (●) Yes

20. Print Name:
Douglas Halliday

21. Date:

22. Do you claim confidentiality of data? (If Yes, see instructions.) (●) No ( ) Yes

23. Check List: [X] Authorized Signature/Date [X] Form 400-CEQA [X] Supplemental Form(s) (ie., Form 400-E-xx) [X] Fees Enclosed

AQMD USE ONLY	APPLICATION TRACKING #	CHECK #	AMOUNT RECEIVED $	PAYMENT TRACKING #	VALIDATION

DATE	APP REJ	DATE	APP REJ	CLASS I III	BASIC CONTROL	EQUIPMENT CATEGORY CODE	TEAM	ENGINEER	REASON/ACTION TAKEN

South Coast Air Quality Management District

Form 400-CEQA
California Environmental Quality Act (CEQA) Applicability

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

The SCAQMD is required by state law, the California Environmental Quality Act (CEQA), to review discretionary permit project applications for potential air quality and other environmental impacts. This form is a screening tool to assist the SCAQMD in clarifying whether or not the project[1] has the potential to generate significant adverse environmental impacts that might require preparation of a CEQA document [CEQA Guidelines §15060(a)].[2] Refer to the attached instructions for guidance in completing this form.[3] For each Form 400-A application, also complete and submit one Form 400-CEQA. If submitting multiple Form 400-A applications for the same project at the same time, only one 400-CEQA form is necessary for the entire project. If you need assistance completing this form, contact Permit Services at (909) 396-3385 or (909) 396-2668.

Section A - Facility Information

1. Facility Name (Business Name of Operator To Appear On The Permit): Bicent (California) Malburg, LLC

2. Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 155474

3. Project Description: Rule 219 Exmept Cooling Tower Registration

Section B - Review For Exemption From Further CEQA Action

Check "Yes" or "No" as applicable

	Yes	No	Is this application for:
1.	◉	○	**A CEQA and/or NEPA document previously or currently prepared that specifically evaluates this project?** If yes, attach a copy of the signed Notice of Determination to this form.
2.	○	○	**A request for a change of permittee only (without equipment modifications)?**
3.	○	○	**A functionally identical permit unit replacement with no increase in rating or emissions?**
4.	○	○	**A change of daily VOC permit limit to a monthly VOC permit limit?**
5.	○	○	**Equipment damaged as a result of a disaster during state of emergency?**
6.	○	○	**A Title V** (i.e., Regulation XXX) **permit renewal (without equipment modifications)?**
7.	○	○	**A Title V administrative permit revision?**
8.	○	○	**The conversion of an existing permit into an initial Title V permit?**

If "**Yes**" is checked for any question in Section B, your application does not require additional evaluation for CEQA applicability. Skip to Section D - Signatures on page 2 and sign and date this form.

Section C - Review of Impacts Which May Trigger CEQA

Complete Parts I-VI by checking "Yes" or "No" as applicable. To avoid delays in processing your application(s), explain all "Yes" responses on a separate sheet and attach it to this form.

	Yes	No	Part I - General
1.	○	○	**Has this project generated any known public controversy regarding potential adverse impacts that may be generated by the project?** Controversy may be construed as concerns raised by local groups at public meetings; adverse media attention such as negative articles in newspapers or other periodical publications, local news programs, environmental justice issues, etc.
2.	○	○	**Is this project part of a larger project?** If yes, attach a separate sheet to briefly describe the larger project.
			Part II - Air Quality
3.	○	○	**Will there be any demolition, excavating, and/or grading construction activities that encompass an area exceeding 20,000 square feet?**
4.	○	○	**Does this project include the open outdoor storage of dry bulk solid materials that could generate dust?** If Yes, include a plot plan with the application package.

[1] A "project" means the whole of an action which has a potential for resulting in physical change to the environment, including construction activities, clearing or grading of land, improvements to existing structures, and activities or equipment involving the issuance of a permit. For example, a project might include installation of a new, or modification of an existing internal combustion engine, dry-cleaning facility, boiler, gas turbine, spray coating booth, solvent cleaning tank, etc.

[2] To download the CEQA guidelines, visit http://ceres.ca.gov/env_law/state.html.

[3] To download this form and the instructions, visit http://www.aqmd.gov/ceqa or http://www.aqmd.gov/permit

Section C - Review of Impacts Which May Trigger CEQA (cont.)			
	Yes	No	**Part II - Air Quality (cont.)**
5.	○	○	**Would this project result in noticeable off-site odors from activities that may not be subject to SCAQMD permit requirements?** For example, compost materials or other types of greenwaste (i.e., lawn clippings, tree trimmings, etc.) have the potential to generate odor complaints subject to Rule 402 – Nuisance.
6.	○	○	**Does this project cause an increase of emissions from marine vessels, trains and/or airplanes?**
7.	○	○	**Will the proposed project increase the QUANTITY of hazardous materials stored aboveground onsite or transported by mobile vehicle to or from the site by greater than or equal to the amounts associated with each compound on the attached Table 1?[4]**
			Part III – Water Resources
8.	○	○	**Will the project increase demand for water at the facility by more than 5,000,000 gallons per day?** The following examples identify some, but not all, types of projects that may result in a "yes" answer to this question: 1) projects that generate steam; 2) projects that use water as part of the air pollution control equipment; 3) projects that require water as part of the production process; 4) projects that require new or expansion of existing sewage treatment facilities; 5) projects where water demand exceeds the capacity of the local water purveyor to supply sufficient water for the project; and 6) projects that require new or expansion of existing water supply facilities.
9.	○	○	**Will the project require construction of new water conveyance infrastructure?** Examples of such projects are when water demands exceed the capacity of the local water purveyor to supply sufficient water for the project, or require new or modified sewage treatment facilities such that the project requires new water lines, sewage lines, sewage hook-ups, etc.
			Part IV – Transportation/Circulation
10.			**Will the project result in** (Check all that apply)**:**
	○	○	**a. the need for more than 350 new employees?**
	○	○	**b. an increase in heavy-duty transport truck traffic to and/or from the facility by more than 350 truck round-trips per day?**
	○	○	**c. increase customer traffic by more than 700 visits per day?**
			Part V – Noise
11.	○	○	**Will the project include equipment that will generate noise GREATER THAN 90 decibels (dB) at the property line?**
			Part VI – Public Services
12.			**Will the project create a permanent need for new or additional public services in any of the following areas** (Check all that apply)**:**
	○	○	**a. Solid waste disposal?** Check "No" if the projected potential amount of wastes generated by the project is less than five tons per day.
	○	○	**b. Hazardous waste disposal?** Check "No" if the projected potential amount of hazardous wastes generated by the project is less than 42 cubic yards per day (or equivalent in pounds).

****REMINDER**: *For each "Yes" response in Section C, attach all pertinent information including but not limited to estimated quantities, volumes, weights, etc.***

Section D - Signatures

I HEREBY CERTIFY THAT ALL INFORMATION CONTAINED HEREIN AND INFORMATION SUBMITTED WITH THIS APPLICATION IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE. I UNDERSTAND THAT THIS FORM IS A SCREENING TOOL AND THAT THE SCAQMD RESERVES THE RIGHT TO CONSIDER OTHER PERTINENT INFORMATION IN DETERMINING CEQA APPLICABILITY.

1. Signature of Responsible Official of Firm:		**2. Title of Responsible Official of Firm:** Chief Operating Officer
3. Print Name of Responsible Official of Firm: Douglas Halliday		**4. Date Signed:**
5. Phone # of Responsible Official of Firm: (410) 770-9500	**6. Fax # of Responsible Official of Firm:**	**7. Email of Responsible Official of Firm:** halliday@beowulfenergy.com
8. Signature of Preparer, (If prepared by person other than responsible official of firm):		**9. Title of Preparer:** Consultant
10. Print Name of Preparer: Gregory Darvin		**11. Date Signed:** 05/07/2018
12. Phone # of Preparer: (831) 620-0481	**13. Fax # of Preparer:**	**14. Email of Preparer:** darvin@atmosphericdynamics.com

THIS CONCLUDES FORM 400-CEQA. INCLUDE THIS FORM AND ANY ATTACHMENTS WITH FORM 400-A.

[4] Table 1 – Regulated Substances List and Threshold Quantities for Accidental Release Prevention can be found in the Instructions for Form 400-CEQA.

South Coast Air Quality Management District

Form 400-PS

Plot Plan And Stack Information Form

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Form 400A and Form 400-CEQA.

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944
Tel: (909) 396-3385
www.aqmd.gov

Section A - Operator Information

Facility Name (Business Name of Operator To Appears On The Permit): Bicent (California) Malburg, LLC

Valid AQMD Facility ID (Available On Permit Or Invoice Issued By AQMD): 155474

Address where the equipment will be operated (for equipment which will be moved to various location in AQMD's jurisdiction, please list the initial location site): 4963 Soto St. Vernon, Ca. 90058

(●) **Fixed Location** ( ) **Various Locations**

Section B - Location Data

Plot Plan

Please attach a site map for the project with distances and scales. Identify and locate the proposed equipment on the map. A copy of the appropriate Thomas Brothers page, a web-based map, or a sketch that shows the major streets and location of the equipment is acceptable.

Location of Schools Nearby

Is the facility located within a 1/4 mile radius (1,320 feet) of the outer boundary of a school? ( ) Yes (●) No

If yes, please provide name(s) of school(s) below:

School Name: _____ **School Name:** _____

School Address: _____ **School Address:** _____

Distance from stack or equipment vent to the outer boundary of the school: _____ feet **Distance from stack or equipment vent to the outer boundary of the school:** _____ feet

CA Health & Safety Code 42301.9: "School" means any public or private school used for purposes of the education of more than 12 children in kindergarten or any of grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in private homes.

Population Density

(●) Urban ( ) Rural (<50% of land within 3 km radius accounted for by urban land use categories, i.e., multi-family dwelling or industrial.)

Zoning Classification

( ) **Mixed Use Residential Commercial Zone (M-U)** ( ) **Service and Professional Zone (C-S)** ( ) **Medium Commercial (C-3)**

(●) **Heavy Commercial (C-4)** ( ) **Commercial Manufacturing (C-M)**

Section C - Emission Release Parameters - Stacks, Vents

Stack Data

Stack Height: 45.00 feet (above ground level) **What is the height of the closest building nearest the stack?** _____ feet

Stack Inside Diameter: 264.00 inches **Stack Flow:** 750,000 acfm **Stack Temperature:** _____ °F

Rain Cap Present: ( ) Yes (●) No **Stack Orientation:** (●) Vertical ( ) Horizontal

If the stack height is less than 2.5 times the closest building height (H), please provide information on any building within 5xH distance from the stack (attach additional sheet if necessary):

Building #/Name: Tower has 3 cells **Building #/Name:** data above is for each cell

Building Height: _____ feet (above ground level) **Building Height:** _____ feet (above ground level)

Building Width: _____ feet **Building Width:** _____ feet

Building Length: _____ feet **Building Length:** _____ feet

Receptor Distance From Equipment Stack or Roof Vents/Openings

Distance to nearest residence or sensitive receptor*: _____ feet

Distance to nearest business: _____ feet

Building Information

Are the emissions released from vents and/or openings from a building? ( ) Yes (●) No

If yes, please provide:

Building #/Name: _____ **Building Width:** _____ feet

Building Height: _____ feet (above ground level) **Building Length:** _____ feet

*AQMD Rule 1470 defines SENSITIVE RECEPTOR as meaning any residence including private homes, condominiums, apartments, and living quarters, schools as defined under paragraph (b)(57), preschools, daycare centers and health facilities such as hospitals or retirement and nursing homes. A sensitive receptor includes long term care hospitals, hospices, prisons, and dormitories or similar live-in housing.

South Coast Air Quality Management District

Form 400-PS

Plot Plan And Stack Information Form

This form must be accompanied by a completed Application for a Permit to Construct/Operate - Form 400A and Form 400-CEQA.

Section D - Authorization/Signature			
I hereby certify that all information contained herein and information submittfgfed with this application is true and correct.			
Signature of Preparer:	**Title of Preparer:** Consultant	**Preparer's Phone #:** (831) 620-0481 **Preparer's Email:** darvin@atmosphericdynamics.com	
Contact Person: Kyle McCormack **Contact's Email:** kmccormack@heorotpower.com	**Contact's Phone#:** (303) 442-5590 **Contact's Fax#:**	**Date Signed:** 05/07/2018	

THIS IS A PUBLIC DOCUMENT

Pursuant to the California Public Records Act, your permit application and any supplemental documentation are public records and may be disclosed to a third party. If you wish to claim certain limited information as exempt from disclosure because it qualifies as a trade secret, as defined in the District's Guidelines for Implementing the California Public Records Act, you must make such claim at the time of submittal to the District.

Check here if you claim that this form or its attachments contain confidential trade secret information. ☐