

**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT**

**ENGINEERING AND COMPLIANCE**

**APPLICATION PROCESSING AND CALCULATION**

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 Date: 10/09/09  
 A/P: 432955-57, 469642,  
 502011  
 PROCESSED BY: TN01  
 CHECKED BY: DG, HW

**PERMIT TO OPERATE EVALUATION**

Application name: B Braun Medical, Inc.

(FACILITY ID# 117290)

Mailing address: 2525 McGaw Ave.  
 Irvine, CA 92614

Equipment Location: 2525 McGaw Ave.  
 Irvine, CA 92614

**EQUIPMENT DESCRIPTIONS:**

**SECTION D: FACILITY DESCRIPTION AND EQUIPMENT SPECIFIC CONTIDIONS:**

Equipment	ID No.	Connected to	RECLAIM Source Type/ Monitoring Unit	Emission and Requirements	Conditions
<b>Process 2: POWER AND STEAM GENERATION</b>					
<b>System 2: COGENERATION SYSTEM NO. 1</b>					
TURBINE, NO. 1, NATURAL GAS, SOLAR CENTAUR, MODEL GS-4000, WITH STEAM OR WATER INJECTION, 42- 46.2 MMBTU/HR WITH A/N : 432956  GENERATOR, 2.8MW  BOILER, HRSG, DELTA, MODEL 355-247-E, WITH A HORIZONTAL TUBE ECONOMIZER	D28	C31	NOX: MAJOR SOURCE**	CO: 2000 PPMV NATURAL GAS (5) [RULE 407, 4-2-1982]; CO :10 PPMV NATURAL GAS (4) [RULE 1303(a)(1)-BACT, 5-10-1996]; NH3: 10 PPMV (4) [RULE 1303(a)(1) - BACT, 5-10-1996]  NOX: 34.67 LBS/MMSCF NATURAL GAS (1) [RULE 2012, 12-7-1995; RULE 2012, 4-9-1999]; NOX: 9PPMV NATURAL GAS (4) [RULE1303(A)(1)-BACT, 5-10-1996]  NOX: 68 PPMV NATURAL GAS (8) [40CFR 60 Subpart GG, 3-6-1981]; PM: 0.1 GRAINS/SCF NATURAL GAS (5) [RULE 409, 8-7-1981]  SOX: 150 PPMV NATURAL GAS (8) [40CFR 60 Subpart GG, 3-6-1981]	A63.1, A99.1, A99.2, C8.1, D12.2, D12.3, D12.4, D28.1, D28.2, I331.1, K40.1, K67.1
REACTOR, CO OXIDATION A/N: 469642	C31	D28 C32			
AMMONIA INJECTION, METERING, AND INJECTION GRID	C32	C31 C33			

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A/N: 469642					
SELECTIVE CATALYTIC REDUCTION, PRECIOUS METAL A/N: 469642	C33	C32 S34			C6.1, D12.4
STORAGE TANK, FIXED ROOF, AQUEOUS AMMONIA, WITH A VAPOR RETURN LINE, 1500 GALS A/N: 469642	D41				D144.1
STACK A/N: 469642	S34	C33			D82.1
<b>System 3: COGENERATION SYSTEM NO. 2</b>					
TURBINE, NO. 2, NATURAL GAS, SOLAR CENTAUR, MODEL T-4701, WITH STEAM OR WATER INJECTION, 44.65 49.1 MMBTU/HR WITH A/N: 432957  GENERATOR, 3.3MW  BOILER, HRSG, NATIONAL DYNAMIC, MODEL SERIES 52.5-1614, WITH A HORIZONTAL TUBE ECONOMIZER	D35	C37	NOX: MAJOR SOURCE**	CO: 2000 PPMV NATURAL GAS (5) [RULE 407, 4-2-1982]; CO :10 PPMV NATURAL GAS (4) [RULE 1303(a)(1)-BACT, 5-10-1996]; NH3: 10 PPMV (4) [RULE 1303(a)(1) - BACT, 5-10-1996]  NOX: 34.67 LBS/MMSCF NATURAL GAS (1) [RULE 2012, 12-7-1995; RULE 2012, 4-9-1999]; NOX: 9PPMV NATURAL GAS (4) [RULE 1303(A)(1)-BACT, 5-10-1996]  NOX: 68 PPMV NATURAL GAS (8) [40CFR 60 Subpart GG, 3-6-1981]; PM: 0.1 GRAINS/SCF NATURAL GAS (5) [RULE 409, 8-7-1981]  SOX: 150 PPMV NATURAL GAS (8) [40CFR 60 Subpart GG, 3-6-1981]	A99.1, A99.2, C8.1, D12.2, D12.3, D12.4, D28.1, K40.1, K67.1
BURNER, DUCT, NATURAL GAS, DAVIS, MODEL GDB-225, 25 MMBTU/HR A/N: 432957	D36	C37	NOX: MAJOR SOURCE**	CO: 2000 PPMV NATURAL GAS (5A) [RULE 407, 4-2-1982]; CO :10 PPMV NATURAL GAS (5) [RULE 1303(a)(1)-BACT, 5-10-1996]; NOX: 9 PPMV NATURAL GAS (4) [RULE 1303(a)(1) - BACT, 5-10-1996]  NOX: 27 LBS/MMSCF NATURAL GAS (3) [RULE 2012, 12-7-1995; RULE 2012, 4-9-1999]; PM: 0.1 GRAINS/SCF NATURAL GAS (5) [RULE 409, 8-7-1981]	

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REACTOR, CO OXIDATION A/N: 432955	C37	D35 D36 C38			
AMMONIA INJECTION, METERING, AND INJECTION GRID A/N: 432955	C38	C37 C39			
SELECTIVE CATALYTIC REDUCTION, PRECIOUS METAL A/N: 432955	C39	C38 S40			C10.1, D12.4
STORAGE TANK, FIXED ROOF, AQUEOUS AMMONIA, WITH A VAPOR RETURN LINE, 1500 GALS A/N: 432955	D42				D144.1
STACK A/N:432955	S40	C39			D82.1

**PERMIT CONDITIONS:** (SEE SAMPLE PERMIT)**BACKGROUND:**

B. Braun Medical manufactures pharmaceutical IV solutions and products. This is a RECLAIM and Title V facility and this facility was purchased from McGaw Inc. in July 1998. B Braun Medical submitted the following Class III applications:

**1. A/N 432956:** this application was submitted (on 07/27/04) for correcting the heat rating from 42 MMBtu/hr to 46.2 MMBtu/hr for the gas turbine No. 1 (D28). B Braun Medical actually did not modify this system. By mistake, the heat rating shown on the current permit was actually low heating value instead of high heating value of the burner; the mistake was made by one of the former owners, American McGaw Labs. Following is the history of the previous applications for this equipment:

- **A/N 09654A:** This is the every first application submitted for cogeneration system No. 1. (submitted on 03/06/1981, by American McGaw Lab - ID # 6266). This cogeneration system consisting of a gas turbine (42 MM Btu/hr) with an 18 MMBtu/hr duct burner. The initial system did not have SCR as control equipment. PC was issued for this application on 03/30/1981.
- **A/N 147183:** This application submitted on 07/31/1986 by Kendal McGaw Labs for change of ownership. PO was issued on 01/20/1988.
- **A/N 244990:** This application was submitted on 02/07/1991 by McGraw Inc. This application filed for the modification of the cogeneration system No. 1. The modification included removing the duct burner and adding the SCR as control equipment for cogeneration system No. 1. PC was issued for this system on 8/25/1993. This application was processed for cancellation due to submittal of subsequence application (A/N 345049).

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- **A/N 345049**: This application was submitted by B Braun Medical Inc. on 09/18/1998 for change of ownership. PO was issued for this application on 3/27/08.
  
- **A/N 432956**: This application was submitted on 07/27/04 by B Braun Medical for correcting the heat rating of the gas turbine No. 1 from lower heat rating (42 MMBtu/hr) to higher heat rating ( 46.2 MMBtu/hr).
  
- 2. A/N 432957**: Similar to A/N 432956 above, this application was submitted for the gas turbine No. 2 (D35), requesting for correcting heat rating from 44.65 MMBtu/hr to 49.1 MMBtu/hr. Following is the history of the previous applications for this equipment:
  - **A/N 272347**: This application was submitted on 08/06/1992 by McGaw Inc. (ID#83444) for gas turbine No. 2 (rated 44.65 MMBtu/hr) with a duct burner (rated 25 MMBtu/hr). PC for this equipment was issued on 08/23/2993.
  - **A/N 345042**: this application was submitted on 9/18/1998 by B Braun Medical for change of ownership. PO was issued for this equipment on 3/27/08.
  - **A/N 432957**: This application was submitted on 07/27/04 by B Braun Medical for correcting the heat rating of the gas turbine No. 1 from lower heat rating (44.65 MMBtu/hr) to higher heat rating ( 49.1 MMBtu/hr).
  
- 3. A/N 469642**: This application submitted for the SCR system (C31, C32, C33), which served as control equipment for the gas turbine No. 1 above.
  
- 4. A/N 345046**: This application submitted for the SCR system (C37, C38, C39), which served as control equipment for the gas turbine No. 2 above.
  
- 5. A/N 502011**: This application was submitted for facility permit revision due to the changes for the equipment above.

The gas turbines (D28 and D35) above are monitored by a CEM system, and B Braun Medical has been reported the emissions based on the actual rating of the gas turbines. As mentioned above, no modification was actually done on these gas turbines. former owners of these systems, made mistakes by using LHV as the rating for these systems, and the former permit engineer did not verify if the provided heat inputs were actually HHV or LHV. Therefore, Brian Yeh, Senior AQ Engineering Manager, recommended adjusting the emissions in NSR for the previous applications (A/Ns 345049 and 345042) of these gas turbines.

**PROCESS DESCRIPTION:**

These gas turbines are used primarily to produce electricity for production processes and steam generated is used for process sterilization. These gas turbines are vented to SCR systems and the emissions are monitored by CEM.

Operating schedule of these equipment are 24 hrs/day; 7 days/week; 52 weeks/year

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**EMISSION EVALUATION:**

**I. A/N 432956 & 469642- Cogeneration system No. 1- D28 and the SCR (C31, C32, C33):**

The following emission factors are used for emission calculations:

- NOx = 9 ppmv @ 15% O2 (requirement and Solar Centaur's guarantee)
- CO = 10 ppmv @ 15% O2 (BACT requirement and Solar Centaur's guarantee)
- NH3 = 9 ppmv @ 15% O2 (BACT requirement and Solar Centaur's guarantee)
- HCHO =  $9.58 \times 10^{-2}$  lb/MMscf of natural gas (same as previous A/N 244990- AB2588)
- PM10 = 7.5 lb/MMscf (default emission factor from 2006-2007 AER instruction book)
- SOX = 0.6 lb/MMscf (default emission factor from 2006-2007 AER instruction book)
- ROG = 7.0 lb/MMscf (default emission factor from 2006-2007 AER instruction book)

Maximum Load : 100%

Fuel Used: Natural gas

Previous Burner rating: 42 MMBtu/hr

Correct Burner rating: 46.2 MMBTU/hr

Maximum Operating Schedule: 24 hrs/day; 7 days/week; 52 weeks/yr

$$\text{Emission}_{\text{PM10, ROG, SOX, HCHO}} (\text{lb/hr}) = Q \times \frac{1 \text{ ft}^3}{1050 \text{ Btu}} \times \text{EF}_{\text{ROG, SOX, PM10}}$$

$$\text{Emission}_{\text{NOX, CO, NH3}} (\text{lb/hr}) = Q \times \frac{8710 \text{ dscf}}{10^6 \text{ Btu}} \times (\text{ppm}) \times \frac{20.9}{(20.9 - \%O2)} \times \frac{\text{MW}}{385 \text{ scf}}$$

Where: Q= maximum, rated input (MMBtu/hr)= 46.2 MMBtu/hr

EF= Emission factor (lb/10<sup>6</sup>ft<sup>3</sup>)

MW= Molecular weight (lb/lb-mole)

ppm= part per million (Ex: 10ppm = 10)

Emission increase due to increase in heat rating for Cogeneration system No. 1:

	Emission based on 42 MMBtu/hr				Emission based on 46.2 MMBtu/hr			
	Lb/hr	Lb/day	Lb/year	30 day ave.	Lb/hr	Lb/day	Lb/year	30 day ave.
<b>ROG</b>	2.800E-01	6.72	2446.08	7	3.080E-01	7.39	2690.69	7
<b>SOX</b>	2.400E-02	0.58	209.66	1	2.640E-02	0.63	230.63	1
<b>PM10</b>	3.000E-01	7.20	2620.80	7	3.300E-01	7.92	2882.88	8
<b>NOX</b>	1.393E+00	33.44	12173.46	33	1.533E+00	36.79	13390.80	37
<b>CO</b>	9.425E-01	22.62	8233.26	23	1.037E+00	24.88	9056.58	25
<b>HCHO</b>	3.832E-03	0.09	33.48	0	4.215E-03	0.10	36.82	0
<b>NH3</b>	5.150E-01	12.36	4498.89	12	5.665E-01	13.60	4948.78	14

We will adjust the NSR on the previous application (A/N 345049) with the emissions calculated based on 46.2 MMBtu/hr in the table above.

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**II. A/N 432957& 432955- cogeneration system No. 2 (D35, D36) and SCR (C37, C38, C39):**

Similar to Cogeneration system No. 1, following are the emission calculations for before and after changing the heat rating for cogeneration system No. 2 (with duct burner):

Previous heat rating = 44.65 MMBtu/hr + 25 MMBtu/hr = 69.65 MMBtu/hr (Turbine + Duct Burner)

Correct Heat rating = 49.1 MMBtu/hr + 25 MMBtu/hr = 74.1 MMBtu/hr

Emission increase due to increase in heat rating for Cogeneration system No. 2:

	Emissions based on 69.65 MMBtu/hr				Emissions based on 74.1 MMBtu/hr			
	Lb/hr	Lb/day	Lb/year	30 day ave.	Lb/hr	Lb/day	Lb/year	30 day ave.
ROG	4.643E-01	11.14	4056.42	11	4.940E-01	11.86	4315.58	12
SOX	3.980E-02	0.96	347.69	1	4.234E-02	1.02	369.91	1
PM10	4.975E-01	11.94	4346.16	12	5.293E-01	12.70	4623.84	13
NOX	2.311E+00	55.46	20187.65	55	2.459E+00	59.00	21477.46	59
CO	1.563E+00	37.51	13653.48	38	1.663E+00	39.91	14525.82	40
HCHO	6.355E-03	0.15	55.51	0	6.761E-03	0.16	59.06	0
NH3	8.540E-01	20.50	7460.65	20	9.086E-01	21.81	7937.32	22

We will adjust the NSR on the previous application (A/N 345042) with the emissions calculated based on 74.1 MMBtu/hr in the table above.

**RULES EVALUATION:****Rule 212- Standards for Approving Permits:**

- **212(c)(1):** The subject equipment is not located within 1,000 feet of a school (see attached map in Appendix A); therefore, a public notice is not required.
- **212(c)(2):** Since the emissions are adjusted in the previous applications (A/Ns 345049 and 345042), there is no actual emission increase. Public notice is not required.
- **212(c)(3)(a):** . therefore a public notice is not required.
- **212(c)(3)(b):** There is no emission increase. Therefore, a public notice is not required.

**Rule 401- Visible Emissions:** Compliance is expected if the equipment is properly operated and maintained.

**Rule 402- Public Nuisance:** Compliance with this rule is expected since the emissions from this equipment are small and not expected to create any nuisance problems.

**Rule 405- Solid Particulate Matter- Weight:** Compliance with this rule is expected since the actual PM emission is 0.5 lb/hr, which is lower than the lowest allowable limit for solid particulate matter (0.99 lb/hr - Table 405(a)).

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**Rule 407-Liquid and Gaseous Air Contaminants:** The rule allows a SOx concentration of 500ppm and a CO concentration of 2,000ppm in the gas discharge to the atmosphere. Calculations show a SOx concentration of 0.34 ppm and a CO concentration of 50 ppm. Compliance with rule 407 is expected.

**Rule 431.1-Sulfur Content of Gaseous Air Contaminants:** The owner will use natural gas and propane from the utility company which must contains less than 16ppmv of sulfur in natural gas and less than 40 ppmv of sulfur in propane. Compliance is expected for this rule.

**Rule 1303(a)-BACT:** Since emission is adjusted on the previous applications (A/Ns 345049 and 345042). There is no emission increases for these gas turbines. BACT is not required.

**Rule 1303(b)(1)- Modeling:** modeling is not required since there is no emission increase.

**Rule 1303(b)(2)- Offsets:** Offsets are not required for this facility since there are no emission increase. Compliance is expected.

	VOC (lb/day)	PM10 (lb/day)	NOX (lb/day)	CO (lb/day)	SOX (lb/day)
Current NSR (PTE)	18	20	98	96	2
A/N 432956 emission increase	0	0	0	0	0
A/N 432957 emission increase	0	0	0	0	0
<b>Total PTE</b>	<b>18</b>	<b>20</b>	<b>98</b>	<b>96</b>	<b>2</b>
Threshold limit	22	22	22	159	22
Offset required	0	0	0	0	0

**Rule 1401-New Source Review of Toxic Air Contaminants:** No emission increase. Toxic analysis is not required.

**Rule 2005-New Source Review for RECLAIM:** B Braun has been monitoring and reporting the emission from these gas turbines based on the correct heat rating. There is no emission increase. Compliance is expected.

**CONCLUSIONS AND RECOMMENDATIONS:**

Based on the evaluation contained herein, the subject equipment are expected to comply with all of the District's rules and regulations; therefore, I recommend Permits to Operate be issued to these equipment.