

<b>SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT</b>  <b>ENGINEERING AND COMPLIANCE DIVISION</b>  <b>PERMIT APPLICATION EVALUATION AND CALCULATIONS</b>	PAGES 7	PAGE 1
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	PROCESSED BY GCR	CHECKED BY CDT

**PERMIT TO CONSTRUCT EVALUATION**

**APPLICANT'S NAME:** ORANGE COUNTY SANITATION DISTRICT (OCS D)

**MAILING ADDRESS:** 10844 ELLIS AVENUE  
FOUNTAIN VALLEY, CA 92708-7018  
ATTN.: TERRY AHN, REGULATORY SPECIALIST

**EQUIPMENT ADDRESS:** 22212 Brookhurst Street (PLANT NO. 2)  
Huntington Beach, CA 92646

**FACILITY ID NO.:** 029110

**CONTACT NAME:** Terry Ahn, Regulatory Specialist  
Ph: (714) 593-7082 Fax: (714) 962-2591  
E mail: [tahn@ocsd.com](mailto:tahn@ocsd.com)

**EQUIPMENT DESCRIPTION:** (A/N 545004, 545005)

BOILER, NO. 1, CLEAVER BROOKS, FIRE TUBE TYPE, MODEL CB700-250, SERIAL NO. L-092869, 10,205,800 BTU PER HOUR, DIGESTER GAS AND NATURAL GAS (AS SECONDARY FUEL) FIRED WITH LO-NO<sub>x</sub> BURNER, AMERICAN COMBUSTION TECHNOLOGY OR EQUAL, MODEL SLE-05-250 OR EQUAL, NATURAL GAS PILOT, FLUE GAS RECIRCULATION (FGR) SYSTEM AND OXYGEN TRIM.

BOILER, NO. 2, CLEAVER BROOKS, FIRE TUBE TYPE, MODEL CB700-250, SERIAL NO. L-092868, 10,205,800 BTU PER HOUR, DIGESTER GAS AND NATURAL GAS (AS SECONDARY FUEL) FIRED WITH LO-NO<sub>x</sub> BURNER, AMERICAN COMBUSTION TECHNOLOGY OR EQUAL, MODEL SLE-05-250 OR EQUAL, NATURAL GAS PILOT, FLUE GAS RECIRCULATION (FGR) SYSTEM AND OXYGEN TRIM.

**Conditions:** (A/N 545004, 545005)

1. CONSTRUCTION AND OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN ACCORDANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED UNLESS OTHERWISE NOTED BELOW.  
[RULE 204]
2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.  
[RULE 204]
3. THIS BOILER SHALL BE FIRED ON DIGESTER GAS AND OR NATURAL GAS ONLY. EXCEPT FOR PILOT GAS, NATURAL GAS SHALL ONLY BE USED IF DIGESTER GAS IS NOT AVAILABLE IN SUFFICIENT AMOUNT.  
[RULE 204]

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4. A FUEL METER SHALL BE INSTALLED AND MAINTAINED IN THE FUEL SUPPLY LINE(S) TO MEASURE, INDICATE AND RECORD THE AMOUNT OF FUEL(S) (SCFM) BURNED IN THIS EQUIPMENT.  
[RULE 1146, RULE 1303 (b) (2) – OFFSET]
5. WHEN IN OPERATION, TOTAL HEAT INPUT FOR THIS EQUIPMENT SHALL NOT EXCEED 10, 205, 800 BTU/HR. A DAILY LOG SHALL BE KEPT FOR FUEL USAGE, AND INDICATING FOR DIGESTER GAS THE TOTAL HEATING VALUE (BTU/SCF) OF FUEL BURNED IN THIS EQUIPMENT BASED ON THE RECORDED FLOW RATE (SCFM) AND THE LATEST MONTHLY BTU CONTENT READING.  
[RULE 1303 (b) (2) – OFFSET]
6. THIS EQUIPMENT SHALL BE EQUIPPED WITH A CONTROL SYSTEM TO AUTOMATICALLY REGULATE THE COMBUSTION AIR AND FUEL RATE AS THE BOILER LOAD VARIES. THIS AUTOMATIC CONTROL SYSTEM SHALL BE ADJUSTED AND TUNED PERIODICALLY, ACCORDING TO THE MANUFACTURER’S SPECIFICATIONS TO ASSURE ITS ABILITY TO REPEAT THE SAME PERFORMANCE AT THE SAME BURNER FIRING RATE.  
[RULE 204]
7. THE FLUE GAS RECIRCULATION SYSTEM SHALL BE IN FULL USE WHENEVER THE BOILER IS IN OPERATION.  
[RULE 204]
8. THE OWNER OR OPERATOR OF THIS EQUIPMENT SHALL CONDUCT AN INITIAL PERFORMANCE SOURCE TESTS, UNLESS OTHERWISE APPROVED, UNDER THE FOLLOWING CONDITIONS:
  - A. A TESTING LABORATORY CERTIFIED BY THE CALIFORNIA AIR RESOURCES BOARD AND IN COMPLIANCE WITH DISTRICT RULE 304 (NO CONFLICT OF INTEREST) SHALL CONDUCT THIS TEST.
  - B. A SOURCE TEST PROTOCOL SHALL BE SUBMITTED TO AQMD WITHIN 30 DAYS OF INITIAL START UP AND SHALL BE APPROVED BY AQMD BEFORE THE TEST COMMENCES. THE PROTOCOL SHALL INCLUDE PROPOSED OPERATING CONDITIONS OF THE EQUIPMENT DURING THE TEST, AND A DESCRIPTION OF ALL SAMPLING AND ANALYTICAL PROCEDURES TO BE USED.
  - C. SOURCE TESTING SHALL BE CONDUCTED WITHIN 60 CALENDAR DAYS AFTER NORMAL OPERATION OF THE EQUIPMENT HAS BEEN ESTABLISHED, BUT NO LATER THAN 180 DAYS AFTER INITIAL START UP.
  - D. THE INITIAL PERFORMANCE SOURCE TESTS SHALL BE PERFORMED WHEN THE BOILER IS OPERATING AT MAXIMUM, MINIMUM AND AVERAGE LOAD FOR EACH FUEL (DIGESTER GAS AND NATURAL GAS) TO BE BURNED. THE SAMPLING TIME AT EACH LOAD SHALL BE FOR A MINIMUM OF 15 CONSECUTIVE MINUTES.
  - E. TWO COPIES OF THE SOURCE TEST RESULTS SHALL BE SUBMITTED WITHIN 60 DAYS OF THE TESTS COMPLETION. THE REPORT SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:

FUEL FLOW RATE (EACH FUEL)  
 FLUE GAS FLOW RATE (EACH FUEL)  
 TOTAL HEAT INPUT RATE, BTU/HR (EACH FUEL)  
 TOTAL NON-METHANE ORGANICS (EXHAUST) (DIGESTER GAS)  
 TOTAL PARTICULATES (PM10) (EXHAUST) (DIGESTER GAS)

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OXIDES OF NITROGEN (EXHAUST) (EACH FUEL)  
CARBON MONOXIDE (EXHAUST) (EACH FUEL)  
OXYGEN (EACH FUEL)  
DIGESTER GAS BTU (HHV) AND TOTAL SULFUR CONTENT (AS H<sub>2</sub>S, PPMV)

THE REPORT SHALL PRESENT THE EMISSIONS DATA IN PARTS PER MILLION (PPMV) ON A DRY BASIS, POUNDS PER HOUR, AND LBS/MMBTU.  
[RULE 217, RULE 404, RULE 1146, RULE 1303(A) (1), 1303 (B) (1), 1303(B) (2) - BACT, MODELING AND OFFSET, 1401]

9. THE SOURCE TEST PROTOCOL AND REPORT, PER CONDITION NO. 8, SHALL BE SUBMITTED TO,  
SCAQMD – ATTN. GAURANG RAWAL  
ENERGY/ PUBLIC SERVICES/WASTE MGMT. / TERMINALS - PERMITTING  
ENGINEERING AND COMPLIANCE DIVISION  
21865 COPLEY DRIVE  
DIAMOND BAR, CA 91765

10. EMISSIONS RESULTING FROM THIS EQUIPMENT SHALL NOT EXCEED THE FOLLOWING:

<u>POLLUTANT</u>	<u>POUNDS PER DAY</u>
CO	90.6
NOx	5.52 (3.1 WITH NATURAL GAS)
PM10	3.1
ROG	2.6
SOx	1.4

[RULE 1146, RULE 1303(a) (1) - BACT, 1303(b) (2) - OFFSET]

**Periodic Monitoring:**

11. THE OPERATOR, AT LEAST ONCE EVERY FIVE YEARS, SHALL DETERMINE COMPLIANCE WITH THE EMISSION LIMITS IN CONDITION NO. 10 OF THIS PERMIT USING AQMD-APPROVED TEST METHODS. THE TEST SHALL BE CONDUCTED WHEN THE EQUIPMENT IS OPERATING UNDER NORMAL CONDITIONS. RULE 1146 COMPLIANCE TESTS MAY BE USED TO SATISFY PART OF THIS REQUIREMENT PROVIDED THAT MASS RATES ARE ALSO REPORTED. TO DEMONSTRATE COMPLIANCE WITH RULE 1146 CONCENTRATIONS LIMITS. THE OPERATOR SHALL COMPLY WITH ALL GENERAL TESTING, REPORTING, AND RECORDKEEPING REQUIREMENTS IN SECTIONS E AND K OF THIS PERMIT.  
[RULE 1146, RULE 1303(a) (1) - BACT, 1303(b) (2) - OFFSET, RULE 3004 (a)(4)- PERIODIC MONITORING]

**Emissions And Requirements:**

12. THIS EQUIPMENT IS SUBJECT TO THE APPLICABLE REQUIREMENTS OF THE FOLLOWING RULES AND REGULATIONS:
- CO: 2000 PPMV, RULE 407  
CO: 400 PPMV, @ 3% O<sub>2</sub>, DRY BASIS, RULE 1146  
NOX: 30 PPMV, @ 3% O<sub>2</sub>, DRY BASIS, RULE 1146 (UNTIL 1/1/2015)

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NOX: 15 PPMV, @ 3% O2, DRY BASIS, ON AND AFTER JANUARY 1, 2015, DIGESTER GAS, RULE 1146  
NOX: 9 PPMV, @ 3% O2, DRY BASIS, ON AND AFTER JANUARY 1, 2015, NATURAL GAS-RULE 1146  
PM: RULE 404, SEE APPENDIX B.  
PM: 0.1 GR/SCF, RULE 409  
SO2: 500 PPMV AS SO2, ORANGE COUNTY, RULE 53  
H2S: 40 PPMV TOTAL SULFUR, DIGESTER GAS

**BACKGROUND:**

On 11/27/12, Orange County Sanitation District (OCSD) submitted the following applications;

- A/N 545002 Title V Revision
- A/N 545003 Change of permit conditions (and equipment description revision) to current PC 518276 for odor control system (Biofilters) to treat exhaust from the DAFTs.
- A/N 545004 Alteration/modification to existing boiler (R-D94235, A/N 291030) to comply with Rule 1146 NOx emission limit.
- A/N 545005 Alteration/modification to existing boiler (R-D94232, A/N 291031) to comply with Rule 1146 NOx emission limit. (This is identical equipment to 545004).

Based on 2012 Yr. reported emissions for formaldehyde, the facility is considered a major source for Hazardous Air Pollutants (HAP).

**PROCESS DESCRIPTION:**

The existing identical boilers are designed to operate on a digester gas (primary fuel) and natural gas (as secondary or standby fuel) to generate steam used in the anaerobic digestion process. These boilers are to be modified with new burners to meet Rule 1146 compliance emission limit for NOx. The new burner is rated at 10,250,800 Btu/hr as compared to existing burner rated at 10.46 MMBTU/hr (2% reduction in heat input rating). The boilers are also being rehabilitated with new ancillary feed water pipes, makeup water pipes, steam pipes, feedwater tank, feedwater pump and motor, and new natural gas and digester gas trains.

**EMISSIONS:**

Rated Heat input = 10,205,800 Btu/hr  
Digester gas, HHV = approx 600 Btu/ft<sup>3</sup>  
Digester gas, scfm = 10,205,800 Btu/hr /600 Btu/ft<sup>3</sup> x 1hr/60 min = 283.5 scfm  
Natural gas, scfm = 10,205,800 Btu/hr /1050 Btu/ft<sup>3</sup> x 1hr/60 min = 162 scfm

Exhaust flow rate (DG) = 3317 cfm, 350 deg F, 3% O2 (dry) - per burner mfr., email 4-19-13  
= 3317 x (460+60=520)/ (460+350=810) = 2129 dscfm at 3% O2

Exhaust flow rate (NG) = 3070 cfm, 350 deg F, 3% O2 (dry) - per burner mfr., email 4-19-13  
= 3070 x (460+60=520)/ (460+350=810) = 1971 dscfm at 3% O2

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Check:

Exhaust Flow Rate (NG) = 8710 dscfm/mmbtu, 3% O<sub>2</sub>, 162 scfm = 1737.8 dscfm at 3% O<sub>2</sub>

The larger flows will be used to be conservative.

**NO<sub>x</sub> (DG) = (2129 dscfm) (15 E-06) (1/379) (46) (60) = 0.23 lbs NO<sub>x</sub>/hr = 5.52 lbs NO<sub>x</sub> /day**

**CO (DG) = (2129 dscfm) (400 E-06) (1/379) (28) (60) = 3.77 lbs CO/hr = 90.6 lbs CO/day**

**NO<sub>x</sub> (NG) = (1971 dscfm) (9 E-06) (1/379) (46) (60) = 0.13 lbs NO<sub>x</sub>/hr = 3.12 lbs NO<sub>x</sub> /day**

**CO (NG) = (1971 dscfm) (400 E-06) (1/379) (28) (60) = 3.49 lbs CO/hr = 83.76 lbs CO/day**

<b>Pollutant</b>	<b>EF* Lbs/mmcf</b>	<b>Max. Emissions lbs/hr (R<sub>1</sub> = R<sub>2</sub>)</b>	<b>lbs/day</b>
CO		3.77+	90.6
NO <sub>x</sub>		0.23+	5.52
PM= PM <sub>10</sub>	7.5	0.1276	3.06
ROG	6	0.11 (R <sub>1</sub> = 5.5at 98% DRE)	2.6
SO <sub>x</sub>	3.5	0.06	1.4

\*EF from AQMD Emissions Fees Report/400-E-9

+ Calculated, using DG fuel and burner guarantee/Rule 1146

**Maximum Emissions:**

**Post Modification**

<b><u>Pollutant</u></b>	<b><u>Lbs/hr</u></b>	<b><u>Lbs/day</u></b>
CO	3.77	90.6
NO <sub>x</sub>	0.23	5.52 (3.1 WITH NATURAL GAS)
PM10	0.13	3.1
ROG	0.11	2.6
SO <sub>x</sub>	0.06	1.4

**Pre-Modification**

<b><u>Pollutant</u></b>	<b><u>Lbs/hr</u></b>	<b><u>Lbs/day</u></b>
CO	7	168
NO <sub>x</sub>	0.86	20.6
PM10	0.13	3.1
ROG	0.13	3.1
SO <sub>x</sub>	0.32	7.7

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**RULES EVALUATION:**

**Rule 212:** This is not a significant project and there is no school within 1000' of the emission source. Proposed modification is the replacement of existing burner (10.46 MMBTU/hr to a reduced rating (10.205 MMBTU/hr), resulting in net emissions reduction and reduced cancer risk. No public notice is required. Compliance is expected.

**Rule 401, 402, 404, 407, and 409:** Compliance is expected based on other permitted boilers fired with DG and natural gas.

**Rule 431.1:** Digester gas is expected to have < 40 ppmv total sulfur as H<sub>2</sub>S. Facility has an approved alternative monitoring plan. Compliance is expected.

**Rule 1146:** Boiler emission controls will be designed for NO<sub>x</sub> at 15ppmv and 9 ppmv, 3% O<sub>2</sub>, using DG and NG, respectively. Proposed new burner is a low-NO<sub>x</sub> burner. Boiler retains FGR and O<sub>2</sub> trim. Condition is imposed for such limit for the respective fuel, at 3% O<sub>2</sub>. Rule CO limit =400 ppmv. Rule 1146 (c)(1) (D), Table 1146-1 (Amended Sept. 5, 2008) requires compliance with 15 ppmv NO<sub>x</sub>, at 3% O<sub>2</sub>, by January 2015. Also, Group III units (NG) must meet 9 ppmv by same date. Compliance can be determined upon receipt of the S /T results.

**REG. XIII:** A modification to a permit unit (source) is covered by this regulation, however, Since the new burners will result in no emission increase, there are no BACT, Modeling, or Offset requirements.

**Rule 1401:** Exempt per R1401 (g) (1) (B), for modification with reduced emissions, hence, reduced cancer risk, HIA and HIC indices.

**REG. XXX: Title V Permits**

Compliance with Reg. XXX is expected. A/N 545002 for Title V revision is submitted. For this minor revision no public notice is required but subject to 45-day EPA review. Approved boiler permit will be included under Title V revision.

**40CFR Part 60 (Regulation IX of SCAQMD Rules)**

- **Subpart D** of 40 CFR Part 60 - New Source Performance Standards for Fossil Fuel Fired Steam Generators constructed after August 17, 1971
- **Subpart Da** of 40 CFR Part 60 - New Source Performance Standards for Electric Utility Steam Generating Units constructed after September 18, 1978
- **Subpart Db** of 40 CFR Part 60 - New Source Performance Standards for Industrial-Commercial-Institutional Steam Generating Units constructed after June 19, 1984
- **Subpart Dc** of 40 CFR Part 60 - New Source Performance Standards for Small Industrial-Commercial-Institutional Steam Generating Units constructed after June 9, 1989

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These boilers were constructed after June 9, 1989 (actually in 1994), and therefore subject to Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

§ 60.40c - Applicable for this boiler (heat input >10 mmbtu/hr and <= 100 mmbtuh).

§ 60.42c - 60.47c – Emission limits, testing, monitoring for Sox and PM are not applicable to this equipment which only burn digester gas and natural gas.

§ 60.48c – Initial notification only.

Since the initial notification requirement is a prior requirement, no specific Dc permit conditions will be imposed.

**National Emission Standards for Hazardous Air Pollutants (NESHAP) - 40 CFR part 63 subpart DDDDD for Industrial, Commercial, and Institutional and Process Heaters**

The facility is a Major Source for hazardous air pollutants (HAPs) based on toxic pollutants' emissions reported for the year 2012, as Formaldehyde emission was 25, 480 lbs/yr (12.74 TPY > 10 TPY, definition for HAP major source). OCSD confirmed reported formaldehyde emissions, email of 7/17/13.

The boiler is subject to subpart DDDDD compliance requirements, initial notification only:

- Boiler can be classified as an Industrial boiler used for processing or used in an industry to provide steam, hot water, and/or electricity.
- It is designed to burn gas 1 fuels; means a gaseous fuel that is not natural gas or refinery gas and does not exceed a maximum concentration of 40 micrograms/cubic meters of mercury.
- It meets the large gaseous fuel subcategory.
- Per § 63.7500 (e), boilers and process heaters in the units designed to burn gas 1 fuels subcategory **are not subject to** the emission limits in Tables 1 and 2 or 11 through 13 to this subpart, or the operating limits in Table 4 to this subpart.
- Per § 63.7506 (b)(1), Existing large gaseous fuel unit are subject only to initial notification (i.e., not subject to emission limits, work practice standards, performance testing, monitoring, SSMP, plans, recordkeeping, or reporting).

Since the initial notification requirement is a prior requirement, no specific DDDDD permit conditions will be imposed

**CONCLUSION/RECOMMENDATION:**

The above boiler is expected to comply with all applicable AQMD's Rules and Regulations. A Permit to Construct is recommended subject to conditions, and upon 45-day EPA review for the Title V Facility Permit revision.