



**South Coast
Air Quality Management District**

Engineering Division
Application Processing & Calculations

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APPL NO.

522545, 6

DATE

8/5/2011

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PERMIT TO OPERATE EVALUATION

APPLICANT:

OLS Energy-Chino
PO Box 1520
Chino, CA 91708-1520

EQUIPMENT LOCATION:

5601 Eucalyptus Ave
Chino, CA 91710

EQUIPMENT DESCRIPTION:

Section D of the RECLAIM Facility Permit, ID# 47781

Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions and Requirements	Conditions
PROCESS 2: EXTERNAL COMBUSTION					
BOILER NO. 1, NATURAL GAS, BABCOCK AND WILCOX, MODEL FM 10-52, WITH LOW NOX BURNER, WITH FGR , 31 MMBTU/HR WITH A/N: 436918 522545 BURNER, NATURAL GAS, COEN, MODEL DAF, WITH LOW NOX BURNER, 31 MMBTU/HR	D6		NOX: LARGE SOURCE	CO: 400 PPPM (5A) [RULE 1146]; CO: 2000 PPM (5) [RULE 407]; CO: 100 PPM (4) BACT ; NOX: 37.245 PPM NATURAL GAS (3) [RULE 2012]; PM: 0.1 GRAINS/SCF (5) [RULE 409]	C1.1, E17.1, E71.2, E193.1, K48.1
BOILER NO. 2, NATURAL GAS, BABCOCK AND WILCOX, MODEL FM 10-52, WITH LOW NOX BURNER, WITH FGR , 31 MMBTU/HR WITH A/N: 436414 522545 BURNER, NATURAL GAS, COEN, MODEL DAF, WITH LOW NOX BURNER, 31 MMBTU/HR	D7		NOX: LARGE SOURCE	CO: 400 PPPM (5A) [RULE 1146]; CO: 2000 PPM (5) [RULE 407]; CO: 100 PPM (4) BACT ; NOX: 37.245 PPM NATURAL GAS (3) [RULE 2012]; PM: 0.1 GRAINS/SCF (5) [RULE 409]	C1.1, E17.1, E71.2, E193.1, K48.1



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BACKGROUND:

The boilers were originally issued Permits to Construct in the early 1990's under A/N's 223773 and 223766. Permits to Operate D68317 and D68316 were issued on 1/15/93. The permits were modified in 2005 under A/N's 436918 and 436414 to allow the boilers to operator up to a maximum of 24 hours/day (previously they were limited to 3 hours/day maximum). Permits to Operate F80238 and F80239 were issued on 1/19/06 and remain active.

These latest applications were submitted in response to a Notice to Comply issued on 4/1/11 due to the fact that the boilers operate with a Flue Gas Recirculation system which is not listed in the permit description. The following applications were submitted:

A/N	Equipment	Category Code	Fees
522545	Boiler No.1	011004	6,858.84*
522546	Boiler No.2	011004	2,3429.42*
522540	Title V Revision	555009	1,723.07

* Includes 50% penalty for not obtaining a Permit to Construct.

The facility is subject to RECLAIM as well as Title V.

PROCESS DESCRIPTION:

OLS- Energy Chino operates a cogeneration system consisting of a gas turbine and 2 steam boilers which are used to provide steam to the California Institute for Men (CIM), the prison facility nearby. The gas turbine also produces electricity for sale to Southern California Edison. The rated power output for the facility is about 30MW. The boilers are each rated at 31 mmbtu/hr heat input.

Boiler Description

Specification	
Boiler Manufacturer	Babcock and Wilcox
Model	FM 10-52
Boiler Type	Water Tube
Fuel Type	Natural Gas
Maximum Fuel Consumption	29,500 scf/hr ⁽¹⁾
Maximum Exhaust Flow	316,000 scf/hr ⁽²⁾
Maximum Heat Input	31 mmbtu/hr
NOx Combustion Control	Low NOx Burner/FGR
Number of Burners	1
Burner Manufacturer	Coen
Outlet NOx	40 ppm

(1) Estimated based on 1050 btu/cf natural gas heat content



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(2) Estimated based on an F-Factor of 8710 cf/mmbtu adjusted for 3% O2 content

COMPLIANCE RECORD REVIEW:

AQMD compliance database records show that this facility has been issued 2 Notices to Comply and no Notices of Violation or complaints in the last 2 years.

Notice No.	Issue Date	Reason
D12236	3/24/11	Verify the operator of the facility
D12237	4/1/11	Update the permit to include the boiler FGRs

EMISSIONS:

The FGR system on these boilers has been in operation since the units were constructed. These applications were submitted to simply update the permit description to match the equipment configuration in the field. Therefore, there is no change in the emissions as a result of these applications. Emissions are calculated based on standard emission factors and exhaust concentration levels. The calculations can be referenced in Appendix A. Following is a summary:

Emissions Boiler No. 1 (A/N 522545)

Pollutant	Maximum ⁽¹⁾		30 Day Average	Annual ⁽²⁾
	lbs/hr	lbs/day	lbs/day	lbs/yr
NOx	1.53	36.7	37	1340
CO	2.33	55.9	56	2041
VOC	0.16	3.8	4	140
PM10	0.22	5.3	5	193
SOx	0.018	0.4	0	16

(1) Assumes controlled emissions = uncontrolled emissions
(2) Assumes the boiler operates 10% of the time, or 876 hrs/yr.

Emissions Boiler No. 2 (A/N 522546)

Pollutant	Maximum ⁽¹⁾		30 Day Average	Annual ⁽²⁾
	lbs/hr	lbs/day	lbs/day	lbs/yr
NOx	1.42	34.1	34	1244
CO	2.33	55.9	56	2041
VOC	0.16	3.8	4	140
PM10	0.22	5.3	5	193
SOx	0.018	0.4	0	16

(1) Assumes controlled emissions = uncontrolled emissions
(2) Assumes the boiler operates 10% of the time, or 876 hrs/yr.

Note that the boilers cannot operate simultaneously with the turbine.



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EVALUATION:

Rule 212 – Standards for Approving Permits

The facility is not within 1000 feet of a school and there is no increase in emissions from the updating of the permit description to add the FGR under this application. Therefore, this is not considered a significant project under the rule and no public notice is required.

Rule 401 – Visible Emissions

Visible emissions are not expected under normal operation.

Rule 402 – Nuisance

Nuisance problems are not expected with proper operation of this equipment.

Rule 407 – Liquid and Gaseous Air Contaminants

This rule limits the CO emissions to 2000 ppm. The Rule 1146 CO limit of 400 ppm is more stringent. Based on old test results from the boiler, CO emissions are very low. The boilers must be periodically tested for CO emissions in accordance with Rule 1146. The SO₂ portion of the rule does not apply as the natural gas fired in the boilers will be subject to the sulfur limit in Rule 431.1.

Rule 409 – Combustion Contaminants

This rule restricts the discharge of contaminants from the combustion of fuel to 0.23 grams per cubic meter (0.1 grain per cubic foot) of gas, calculated to 12% CO₂, averaged over 15 minutes. Although the units have not been tested for PM emissions, the following theoretical calculations show that compliance can be expected:

$$\begin{aligned} \text{Estimated grain loading, gas firing} &= 0.22 \text{ lbs/hr} \times (7000 \text{ gr/lb}) / 0.316\text{E}6 \text{ scf/hr} \\ &= 0.005 \text{ gr/scf} \end{aligned}$$

Rule 431.1 Sulfur Content of Natural Gas

The natural gas supplied to the boilers is expected to comply with the 16 ppmv sulfur limit (calculated as H₂S) specified in this rule. Commercial grade natural gas has an average sulfur content of 4ppm. The applicant will comply with reporting and record keeping requirements as outlined in subdivision (e) of this rule.

Rule 1146 – Boiler NO_x

The facility is in Reclaim, therefore, the NO_x portion of this rule is not applicable. The CO limit is 400 ppm. Based on previous tests of the boilers, the CO emissions are well below this limit. The boilers must be tested using Method 100.1 every 3 years, or the operator may choose to check emissions using a portable analyzer every month (or every quarter, if 3 consecutive tests show compliance).



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Regulation XIII – New Source Review

There is no change in emissions as a result of these applications which were submitted to update the permit description to include the existing FGR systems.

The emissions in the AQMD NSR database have always been entered as 0's for the boilers, since they were originally permitted under a 'bubble' with the turbine. The boilers and turbine are not allowed to operate simultaneously.

Rule 1401 – Toxic Air Contaminants

There is no increase in toxic emissions as a result of these applications which were submitted to update the permit description to include the existing FGR systems.

Rule 2012 – Reclaim

The boilers are classified as Large Sources under Reclaim. Large Sources are required to maintain totalizing fuel meters and perform source testing every 3 years to verify their emission rates. The facility is in compliance with the requirements of Reclaim and continued compliance is expected .

Regulation XXX – Title V

The OLS-Chino facility is subject to the Title V requirements because it is a major source of NOx. The modification proposed under these applications can be considered an administrative permit revision to correct the permit description to reflect the existence of the FGR system. Administrative revisions do not need to be forwarded to EPA.

RECOMMENDATION:

1. Update the CO emission limit on the units to 100 ppm as required by BACT, which was triggered under the last set of applications (A/N's 436318 & 436414) when the units were allowed to go from 3 hrs/day operation to 24 hrs/day operation.
2. Expand the recordkeeping requirements of condition K48.1.

After the 45 EPA review period, issue a Permit to Operate.

CONDITIONS:

C1.1

The operator shall limit the natural gas usage to no more than 708,570 cubic feet per day.
[Rule 1303 – Offsets]

E17.1

The operator shall not use more than 1 of the following items simultaneously:

Device ID: D1 [TURBINE]

Device ID: D6 [BOILER NO. 1]

[Rule 1303 – Offsets]



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E17.2

The operator shall not use more than 1 of the following items simultaneously:

Device ID: D1 [TURBINE]

Device ID: D7 [BOILER NO. 2]

[Rule 1303 – Offsets]

E71.2

The operator shall not use this equipment when the cogeneration equipment is operating except as follows: 1) during the scheduled shutdown or start up of the cogeneration system for a period of time not to exceed 60 minutes. A written notice of the scheduled shutdown must be provided to the District 7 days prior to the shutdown of the cogeneration system. 2) For testing purposes not to exceed 12 hours in any calendar year.

[Rule 1303 – Offsets]

E193.1

The operator shall operate and maintain this equipment according to the following requirements:

1. In the event of a shutdown of the cogeneration system and the utility electricity is not available, boilers D6 and D7 may operate up to 24 hours in any one day but not simultaneously with the cogeneration system, except as provided in condition E71.2.

[Rule 1303 – Offsets]

K48.1

The operator shall maintain records in a manner approved by the District, to demonstrate compliance with the following condition number:

Condition No. C1.1

Condition No. E17.1

Condition No. E17.2

Condition No. E71.2

Condition No. E193.1



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Appendix A

Emission Calculations

Emissions are estimated based on standard emission factors for natural gas fired external combustion equipment, with the exception of NOx, which is based on 37.2 ppm, and CO which is based on 100 ppm.

Pollutant	Emission Rate	Emissions, lbs/hr
NOx	37.2 ppm	1.42
CO	100 ppm	2.33
VOC	5.5 lbs/mmcf	0.16
PM10	7.6 lbs/mmcf	0.22
SOx	0.6 lbs/mmcf	0.018

Calculations:

Fuel Use Rate 29,500 scf/hr (31 mmbtu/hr/1050 btu/scf)

Exhaust Flow 316,000 scf/hr (8710 scf/mmbtu*31 mmbtu/hr*1.17)

NOx:

$(37.2 \text{ ppm} * 0.316 \text{ mmscf/hr} * 46 \text{ lbs/lb-mole}) / 380 \text{ cf/lb-mole}$

CO:

$(100 \text{ ppm} * 0.316 \text{ mmscf/hr} * 28 \text{ lbs/lb-mole}) / 380 \text{ cf/lb-mole}$

The emissions as calculated above differ slightly from the calculations done under the previous applications.