777 12th Street, Third Floor

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Sacramento, CA 95814

BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION

DETERMINATION NO.:	128
DATE:	2-16-16
ENGINEER:	Joe Carle
Category/General Equip Description:	Boiler/Heater – Natural Gas Fired
Equipment Specific Description:	Boiler/heater greater or equal to 2 and less than 5 MMBTU/hr, fired on natural gas
Equipment Size/Rating:	Minor Source BACT
Previous BACT Det. No.:	54, 61, and 62

This BACT determination will update the following determinations

#54 which was made on 4-25-2012 for non-atmospheric boilers/heaters ≥ 2 and < 5 MMBtu.
#61 which was made on 3-15-2013 for non-atmospheric boilers/heaters ≥ 2 and < 5 MMBtu.
#62 which was made on 3-15-2013 for atmospheric boilers/heaters ≥ 2 and < 5 MMBtu.

BACT ANALYSIS

A: ACHIEVED IN PRACTICE (Rule 202, §205.1a)

The following control technologies are currently employed as BACT for boilers/heaters greater or equal to 2 and less than 5 MMBTU/hr by the following air pollution control districts:

<table>
<tr><th>District/ Agency</th><th>Best Available Control Technology (BACT)/Requirements</th></tr>
<tr><td>US EPA</td><td>
BACT
Source: EPA RACT/BACT/LAER Clearinghouse
RBLC ID: CA-1185
<table>
<tr><td colspan="2">For non-atmospheric units with a rating of ≥ 2 to <5 MMBtu/hr*</td></tr>
<tr><td>VOC</td><td>Use natural gas and good combustion techniques</td></tr>
<tr><td>NOx</td><td>12 ppmvd corrected to 3% O_2</td></tr>
<tr><td>SOx</td><td>Use natural gas and good combustion techniques</td></tr>
<tr><td>PM10</td><td>Use natural gas and good combustion techniques</td></tr>
<tr><td>CO</td><td>100 ppmvd corrected to 3% O_2</td></tr>
</table>
* This BACT determination was found to be the most stringent Achieved in Practice BACT determination published in the EPA clearinghouse. See Attachment A for more information.

No BACT determinations found for atmospheric units in the ≥ 2 to < 5 MMBtu/hr range.
</td></tr>
</table>

<table>
<tr><th>District/ Agency</th><th>Best Available Control Technology (BACT)/Requirements</th></tr>
<tr><td>US EPA</td><td><u>RULE REQUIREMENTS</u>:
None.</td></tr>
<tr><td>ARB</td><td><u>BACT</u>
Source: ARB BACT Clearinghouse
ATC 13623 (6-7-11) SBCAPCD

<table>
<tr><td colspan="2">For non-atmospheric units with a rating of ≥ 2 to < 5 MMBtu/hr</td></tr>
<tr><td>VOC</td><td>No BACT determinations found for VOC in the ≥ 2 to < 5 MMBtu/hr range.</td></tr>
<tr><td>NOx</td><td>12 ppmvd corrected to 3% O_2 [SBCAPCD]</td></tr>
<tr><td>SOx</td><td>No BACT determinations found for SOx in the ≥ 2 to < 5 MMBtu/hr range.</td></tr>
<tr><td>PM10</td><td>No BACT determinations found for PM10 in the ≥ 2 to < 5 MMBtu/hr range.</td></tr>
<tr><td>PM2.5</td><td>No BACT determinations found for PM2.5 in the ≥ 2 to < 5 MMBtu/hr range.</td></tr>
<tr><td>CO</td><td>100 ppmvd corrected to 3% O_2 [SBCAPCD]</td></tr>
</table>
Note: The most stringent standards in the ARB BACT Clearinghouse was from the SCAQMD having a NOx standard of 2 ppmvd @ 3% O_2 using SCONOx technology. The determination noted that the SCAQMD does not consider this standard achieved in practice and therefore, the next most stringent standard was selected. See Attachment B for more information.

No BACT determinations found for atmospheric units in the ≥ 2 to < 5 MMBtu/hr range.

<u>RULE REQUIREMENTS</u>:
None</td></tr>
<tr><td>SMAQMD</td><td><u>BACT</u>
Source: SMAQMD BACT Clearinghouse

<u>BACT Determination No. 61 - Non-atmospheric units with a rating of ≥ 2 to < 5 MMBtu/hr 1 (3-15-13)</u>
<table>
<tr><td colspan="2">For non-atmospheric units with a rating of ≥ 2 to < 5 MMBtu/hr</td></tr>
<tr><td>VOC</td><td>Good combustion practice.</td></tr>
<tr><td>NOx</td><td>9 ppmvd corrected to 3% O_2</td></tr>
<tr><td>SOx</td><td>Use of natural gas.</td></tr>
<tr><td>PM10</td><td>Use of natural gas.</td></tr>
<tr><td>PM2.5</td><td>No standard</td></tr>
<tr><td>CO</td><td>400 ppmvd corrected to 3% O_2</td></tr>
</table>
<u>BACT Determination No. 62 - Atmospheric units with a rating of ≥ 2 to < 5 MMBtu/hr 1 (3-15-13)</u>
<table>
<tr><td colspan="2">For atmospheric units with a rating of ≥ 2 to < 5 MMBtu/hr</td></tr>
<tr><td>VOC</td><td>Good combustion practice.</td></tr>
<tr><td>NOx</td><td>12 ppmvd @ 3% O_2.</td></tr>
<tr><td>SOx</td><td>Use of natural gas.</td></tr>
<tr><td>PM10</td><td>Use of natural gas.</td></tr>
<tr><td>PM2.5</td><td>No standard</td></tr>
<tr><td>CO</td><td>400 ppmvd @ 3% O_2</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>District/ Agency</th><th>Best Available Control Technology (BACT)/Requirements</th></tr>
<tr><td>SMAQMD</td><td><u>RULE REQUIREMENTS</u>:

<u>Rule 411 – NOx from Boilers, Process Heaters, and Steam Generators</u> (8-23-2007)
For units with a rating of ≥ 2 and < 5 MMBtu/hr, emissions shall not exceed the following levels:
1. 30 ppmvd of NOx corrected to 3% O2
2. 400 ppmvd of CO corrected to 3% O2</td></tr>
<tr><td>South Coast AQMD</td><td><u>BACT</u>
Source: SCAQMD BACT Guidelines for Non-Major Polluting Facilities, page 13.
Note: SCAQMD's published BACT is less stringent than Rule 1146.1
<table>
<tr><td colspan="2">For both atmospheric and non-atmospheric fired units, fueled by natural gas, with a rating of ≥ 2 and < 5 MMBtu/hr:</td></tr>
<tr><td>VOC</td><td>Use of natural gas</td></tr>
<tr><td>NOx</td><td>12 ppmvd corrected to 3% O_2.</td></tr>
<tr><td>SOx</td><td>Use of natural gas</td></tr>
<tr><td>PM10</td><td>Use of natural gas</td></tr>
<tr><td>PM2.5</td><td>No standard</td></tr>
<tr><td>CO</td><td>Firetube Boiler: 50 ppmvd corrected to 3% O_2
Watertube Boiler: 100 ppmvd corrected to 3% O_2</td></tr>
</table>
<u>RULE REQUIREMENTS</u>:

<u>Reg XI, Rule 1146.1 – Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters</u> (11-1-2013)

Requirements Table 1146-1
<table>
<tr><th>Category</th><th>NOx Limit</th><th>Unit Shall be in Full Compliance on or before</th></tr>
<tr><td>Natural Gas Fired Atmospheric Units</td><td>12 ppmvd @ 3% O_2
or 0.015 lbs/10^6 BTU</td><td>January 1, 2014</td></tr>
<tr><td>Any unit fired on natural gas, excluding units located at schools or universities, atmospheric units, and thermal fluid heaters</td><td rowspan="2">9 ppm @ 3% O_2
or 0.011 lbs/10^6 BTU</td><td>January 1, 2012</td></tr>
<tr><td>Any unit fired on natural gas located at schools and universities, excluding atmospheric units and thermal fluid heaters</td><td>January 1, 2014</td></tr>
</table>
All units rated > 2 MMBtu/hr must have CO emissions ≤ 400 ppmvd @ 3% O_2</td></tr>
</table>

District/ Agency	Best Available Control Technology (BACT)/Requirements
San Diego County APCD	**BACT** Source: NSR Requirements for BACT, page 3-5 Note: SDCAPCD BACT Guidelines do not contain a specific determination for boilers/heaters in the size range of 2 to less than 5 MMBtu/hr, since these units are not required to obtain a written permit, pursuant to SDAPCD Regulation II Rule 11 – Exemptions from Rule 10 Permit Requirements. SDAPCD Rule 11(d) Any equipment, operation, or process that is listed below in Subsections (d)(1) through (d)(20), and that meets the stated exemption provision, parameter, requirement, or limitation, is exempt from the requirements of Rule 10. (d)(2)(v) Any boiler, process heater, or steam generator with a manufacturer's maximum gross heat input rating of less than 5 million BTU per hour fired exclusively with natural gas and/or liquefied petroleum gas. The SDCAPCD has a BACT determination that applies to natural gas or propane fired boilers/heaters with a rating of less than 50 MMBtu/hr. The SDCAPCD has a BACT trigger level of 10.0 lbs/day for NOx, VOC, SOx and PM10. No limits have been established for PM2.5 or CO. Since, boilers in the size range of 2 to less than 5 MMBtu/hr are exempt from permit requirements, this BACT guideline does not apply. **RULE REQUIREMENTS**: **Regulation 4, Rule 69.2.1 – Industrial and Commercial Boilers, Process Heaters and Steam Generators (3-25-2009)** For any unit with a heat input rating from 600,000 Btu/hr to 2 MMBtu/hr. (Note that for this BACT determination only units rated exactly at 2 MMBtu/hr would apply) 1. 30 ppmvd of NOx when operated on a gaseous fuel, corrected to 3% O_2 2. 40 ppmvd of NOx when operated on a liquid fuel, corrected to 3% O_2 3. 400 ppmvd of CO corrected to 3% O_2 The SDCAPCD does not have a prohibitory rule that applies to boilers rated at greater than or equal to 2 MMBtu/hr and less than 5 MMBtu/hr.
Bay Area AQMD	**BACT** Source: BAAQMD BACT Guideline Note: BAAQMD BACT Guidelines do not contain a determination for boilers/heaters 10 MMBtu/hr or less fired exclusively on natural gas or LPG, since these units are not required to obtain a written permit, pursuant to BAAQMD Regulation 2, Rule 1 – General Requirements. BAAQMD Rule 2-1-114 – General Requirements The following equipment is exempt from the, requirements of Sections 2-1-301 and 302 (requirement to obtain an ATC or PTO): (114.1) Boilers, Heaters, Steam Generators, Duct Burners, and Similar Combustion Equipment: 1.2 Any of the above equipment with less than 10 million BTU per hour rated heat input if fired exclusively with natural gas (including compressed natural gas), liquefied petroleum gas (e.g. propane, butane, isobutane, propylene, butylenes, and their mixtures), or any combination thereof.

<table>
<tr><th>District/ Agency</th><th>Best Available Control Technology (BACT)/Requirements</th></tr>
<tr><td>Bay Area AQMD</td><td>
<u>RULE REQUIREMENTS</u>:
<u>Regulation 9, Rule 6 – Nitrogen Oxides Emissions from Natural Gas-Fired Water Heaters</u> (11-7-2007)
For units with a rating of 400,001 Btu/hr to 2 MMBtu/hr:
1. Manufactured after 1/1/2008: NOx limit of 30 ppmvd corrected to 3% O_2.
2. Manufactured after 1/1/2013: NOx limit of 20 ppmvd corrected to 3% O_2.

<u>Regulation 9, Rule 7 – Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters (5-4-2011)</u>
For units with a rating of greater than 2 MMBtu/hr and less than or equal to 5 MMBtu/hr:
1. NOx limit of 30 ppmvd corrected to 3% O_2
2. CO limit of 400 ppmvd corrected to 3% O_2
</td></tr>
<tr><td>San Joaquin Valley APCD</td><td>
<u>BACT</u>
Source: SJVUAPCD BACT Guideline (Rescinded)
The boiler BACT determinations listed in the SJVAPCD Clearinghouse have been rescinded.

Note: SJVUAPCD BACT Guidelines do not contain a determination for boilers 5 MMBtu/hr or less, since these units are not required to obtain a written permit, pursuant to SJUVAPCD Rule 2020 - Exemptions.

SJVUAPCD Rule 2020 §6.0
No Authority to Construct or Permit to Operate shall be required for (§6.1) steam generators, steam super heaters, water boilers, water heaters, steam cleaners, and closed indirect heat transfer systems that have a maximum input heat rating of 5,000,000 Btu per hour (gross) or less and is equipped to be fired exclusively with (§6.1.1.1) natural gas, (§6.1.1.2) liquefied petroleum gas, or (§6.1.1.3) any combination of the two.

<u>RULE REQUIREMENTS</u>:

<u>Rule 4307 – Boilers, Steam Generators, and Process Heaters – 2.0 MMBtu/hr to 5.0 MMBtu/hr</u>
<table>
<tr><th>Type</th><th>NOx Limit ppmvd @ 3% O_2</th><th>CO Limit ppmvd @ 3% O_2</th><th>Effective Date</th></tr>
<tr><td>New or replacement atmospheric units not listed below</td><td>12</td><td>400</td><td>1/1/2010</td></tr>
<tr><td>New or replacement atmospheric unit that is one of the following:
- A unit used at a school, or
- A unit in an oil field or refinery, or
- a glycol reboiler, or
- A unit with a heat input of 1.8 to 5.0 billion Btu per calendar year.</td><td>12</td><td>400</td><td>1/1/2016</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>District/ Agency</th><th>Best Available Control Technology (BACT)/Requirements</th></tr>
<tr><td>San Joaquin Valley APCD</td><td>
<table>
<tr><th>Type</th><th>NOx Limit ppmvd @ 3% O_2</th><th>CO Limit ppmvd @ 3% O_2</th><th>Effective Date</th></tr>
<tr><td>New or replacement non-atmospheric units not listed below</td><td>9</td><td>400</td><td>1/1/2010</td></tr>
<tr><td>New or replacement non-atmospheric unit that is one of the following:
- A unit used at a school, or
- A unit in an oil field or refinery, or
- a glycol reboiler, or
- A unit with a heat input of 1.8 to 5.0 billion Btu per calendar year.</td><td>9</td><td>400</td><td>1/1/2016</td></tr>
</table>
</td></tr>
</table>

The following control technologies have been identified and are ranked based on stringency:

SUMMARY OF ACHIEVED IN PRACTICE CONTROL TECHNOLOGIES	
VOC	1. Good combustion practice and use of natural gas – [EPA Clearinghouse - Clark County Dept. of Air Quality] 2. Good combustion practice – [SMAQMD] 3. Use of natural gas – [SCAQMD] 4. No standard – [SJVAPCD, BAAQMD, SDCAPCD]
NOx	1. Non-atmospheric: 9 ppmvd corrected to 3% O_2 Atmospheric: 12 ppmvd corrected to 3% O_2 – [SMAQMD, SCAQMD, SJVUAPCD] 2. Non-atmospheric units:12 ppmvd corrected to 3% O_2 – [SBCAPCD] 3. 20 ppmvd corrected to 3% O2 - [BAAQMD] 4. No standard – [SDCAPCD]
SOx	1. Good combustion practice and use of natural gas – [EPA Clearinghouse - Clark County Dept. of Air Quality] 2. Use of natural gas – [SMAQMD, SCAQMD] 3. No standard – [SJVUAPCD, BAAQMD, SDCAPCD]
PM10	1. Good combustion practice and use of natural gas – [EPA Clearinghouse - Clark County Dept. of Air Quality] 2. Use of natural gas – [SMAQMD, SCAQMD] 3. No standard – [BAAQMD, SJVAPCD, SDCAPCD]
PM2.5	No standard – [SMAQMD, SCAQMD, SDCAPCD, BAAQMD, SJVAPCD, EPA Clearinghouse - Clark County]
CO	1. Firetube Boilers: 50 ppmvd corrected to 3% O_2, and Watertube Boilers: 100 ppmvd corrected to 3% O_2 – [SCAQMD] 2. Non-atmospheric units: 100 ppmvd corrected to 3% O_2 [SBCAPCD] 3. 400 ppm of CO corrected to 3% O2 – [SMAQMD, BAAQMD, SJVAPCD] 4. No standard – [SDCAPCD]

The determination with the 2 ppmvd at 3% O_2 limit, achieved with SCONOx technology, by the SCAQMD, listed in the CARB BACT clearinghouse, is not considered achieved in practice. SCAQMD has permitted several small boilers since the time of this determination and has not required the installation of SCONOx. Additionally, in the notes to the determination the SCAQMD states that they do not consider this determination achieved in practice. Therefore, the following control technologies have been identified as the most stringent, achieved in practice control technologies:

BEST CONTROL TECHNOLOGIES ACHIEVED		
Pollutant	**Standard**	**Source**
VOC	Good combustion practice	Clark County Dept. of AQ (BACT) SMAQMD (current BACT), SCAQMD (BACT)
NOx	Non-atmospheric units: 9 ppmvd at 3% O_2 Atmospheric units: 12 ppmvd at 3% O_2	SMAQMD (current BACT), SCAQMD (Rule 1146.1), SJVUAPCD (Rule 4307)
SOx	Good combustion practice	Clark County Dept. of AQ (BACT) SMAQMD (current BACT), SCAQMD (BACT)
PM10	Good combustion practice	Clark County Dept. of AQ (BACT) SMAQMD (current BACT), SCAQMD (BACT)
PM2.5 (A)	Good combustion practice	Clark County Dept. of AQ (BACT) SMAQMD (current BACT), SCAQMD (BACT)
CO	Firetube Boilers: 50 ppmvd at 3% O_2 Watertube Boilers: 100 ppmvd at 3% O_2	SCAQMD (BACT)

(A) By assuming that all PM10 is PM2.5 we can conclude that the same standard should be used as PM10 despite not having a documented standard in place.

B: TECHNOLOGICALLY FEASIBLE AND COST EFFECTIVE (Rule 202, §205.1.b.)

Technologically Feasible Alternatives:
Any alternative basic equipment, fuel, process, emission control device or technique, singly or in combination, determined to be technologically feasible by the Air Pollution Control Officer.

The table below shows the technologically feasible alternatives identified as capable of reducing emissions beyond the levels determined to be "Achieved in Practice" as per Rule 202, §205.1.a.

Pollutant	Technologically Feasible Alternatives
VOC	Good combustion practice
NOx	Selective Catalytic Reduction (SCR)
SOx	Good combustion practice
PM10	Good combustion practice
PM2.5	Good combustion practice (same as achieved in practice BACT for PM10)
CO	Good combustion practice

Cost Effective Determination:
After identifying the technologically feasible control options, a cost analysis is performed to take into consideration economic impacts for all technologically feasible controls identified.

Maximum Cost per Ton of Air Pollutants Controlled

1. A control technology is considered to be cost-effective if the cost of controlling one ton of that air pollutant is less than the limits specified below (except coating operations):

Pollutant	Maximum Cost ($/ton)
VOC	17,500
NOx	24,500
PM_{10}	11,400
SOx	18,300
CO	TBD if BACT triggered

Cost Effectiveness Analysis Summary

SRC:
Typically selective catalytic reduction (SCR) can be used to reduce emissions from larger boilers. SCR requires ammonia or urea for NOx reduction and units of this size range are typically used in residences and service/commercial applications where storage of these materials is impractical and could pose a health risk. Additionally, SCR is designed for industrial units that run full time and can maintain a temperature that the catalyst requires for NOx reduction, whereas smaller units are turned on and off throughout the day and cannot maintain the required temperatures. Finally, SCR systems require frequent maintenance for operation which may not be practical in a residential or small service/commercial setting.

As shown in Attachment B, the cost effectiveness for the add on SCR system to control NOx to a 5 ppm level for boilers at each end of the size range was calculated to be a minimum of **$33,534/ton** (see Attachment D - Cost Effectiveness Determination for SCR). Since BACT for a boiler in this size range is

never triggered for CO (550 lbs/day max) even with a boiler meeting Rule 411 limits (400 ppmv CO at 3%O2), the cost for the added CO control was not analyzed. The following basic parameters were used in the analysis.

NOx Control Level = 5 ppmv at 3% O_2

NOx Baseline Level = 30 ppmv at 3% O_2

Boiler Rating = 4.999 MMBtu/hr

Equipment Life = 20 years

Direct Cost = $135,388

Direct Annual Cost = $4,278 per year

Indirect Annual Cost = $17,994 per year

Total Annual Cost = $22,272 per year

NOx Removed = 0.66 tons per year

Cost of NOx Removal = $33,534 per ton reduced

As the rating of the unit goes down, the total emission reduction will decrease while cost will stay relatively equivalent and therefore the cost effectiveness will increase (calculated to be a minimum of **$45,163/ton**, see Attachment D - Cost Effectiveness Determination for SCR). Therefore, SCR is not only technologically infeasible for this size range of boilers/heaters but it is also not cost effective and is eliminated as a control option.

Using the PM10 BACT standard for PM2.5:

Natural gas is already required as BACT for PM10. Since both, PM10 and PM2.5 trigger BACT at >0 lbs/day and PM2.5 is a subset of PM10, BACT for PM2.5 will be triggered whenever BACT is triggered for PM10. Therefore, there is no additional cost associated with requiring natural gas as BACT for PM2.5 for new emission units.

C: SELECTION OF BACT

Based on the cost effectiveness determinations, BACT for NOx will remain at what is currently achieved in practice and BACT for PM2.5 will be set to be the same as for PM10 (good combustion practice and use of natural gas).

BACT for Boilers/Heaters ≥ 2 MMBtu/hr and < 5 MMBtu/hr		
Pollutant	**Standard**	**Source**
VOC	Good combustion practice	Clark County Dept. of AQ (BACT) SMAQMD (current BACT), SCAQMD (BACT)
NOx	Non-atmospheric units: 9 ppmvd at 3% O_2 Atmospheric units: 12 ppmvd at 3% O_2	SMAQMD (current BACT), SCAQMD (Rule 1146.1), SJVUAPCD (Rule 4307)
SOx	Good combustion practice	Clark County Dept. of AQ (BACT) SMAQMD (current BACT), SCAQMD (BACT), SDCAPCD (BACT)
PM10	Good combustion practice	Clark County Dept. of AQ (BACT) SMAQMD (current BACT), SCAQMD (BACT)
PM2.5	Good combustion practice	Clark County Dept. of AQ (BACT) SMAQMD (current BACT), SCAQMD (BACT)
CO	Firetube Boilers: 50 ppmvd at 3% O_2 Watertube Boilers: 100 ppmvd at 3% O_2	SCAQMD (BACT)

D: SELECTION OF T-BACT:

Toxics are in the form of VOCs and particulate matter. Since toxic emissions from natural gas fired boilers in the 2 to less than 5 MMBtu/hr size range are so small and the cancer risk is not expected to be anywhere close to 1 in a million cases, T-BACT was not evaluated for this determination. In addition, none of the Districts', EPA or ARB BACT Clearinghouses have a T-BACT determination for this source category.

REVIEWED BY: _____ **DATE:** _____

APPROVED BY: _____ **DATE:** 9/2/16

Attachment A

Review of BACT Determinations published by EPA

List of BACT determinations published in EPA's RACT/BACT/LAER Clearinghouse for boilers ≥ 2 MMBtu/hr to < 5 MMBtu/hr:

Capacity MMBtu/hr	Source	Date	Type	NOx ppmv @ 3% O_2	CO ppmv @ 3% O_2	VOC lbs/MMBtu	Filterable PM10 lbs/MMBtu	SO_2 lbs/MMBtu
3.00	SANTA BARBARA COUNTY APCD	6/7/2011	Non-Atmospheric	12	100	NA	NA	NA
2.00	SANTA BARBARA COUNTY APCD	1/24/2012	Not Specified	20	NA	NA	NA	NA
3.00	SANTA BARBARA COUNTY APCD	1/24/2012	Not Specified	12	NA	NA	NA	NA
3.85	CLARK COUNTY DEPT. OF AIR QUALITY	5/16/2006	Not Specified	83	112	0.0052	0.0078	0.0026
3.85	CLARK COUNTY DEPT. OF AIR QUALITY	5/16/2006	Not Specified	82	112	0.005	0.0078	0.0015
2.10	CLARK COUNTY DEPT. OF AIR QUALITY	11/30/2009	Non-Atmospheric	20	52	0.0048	0.0095	0.0048
4.30	CLARK COUNTY DEPT. OF AIR QUALITY	11/30/2009	Non-Atmospheric	12	49	0.0054	0.007	0.0006
4.20	CLARK COUNTY DEPT. OF AIR QUALITY	11/30/2009	Non-Atmospheric	12	19	0.0048	0.0071	0.0024
4.19	WASHINGTON STATE DEPT. OF ECOLOGY; AIR QUALITY PROGRAM	6/14/2006	Not Specified	34	NA	NA	NA	NA

= For these units the emission limits are not verified through testing and are only manufacturer's guarantees. Verification consists of the owner/operator using natural gas and good combustion practices. Therefore, the numeric standards are not considered achieved in practice.

 = Selected as the most stringent BACT determination achieved in practice.

Process Information - Details

For information about the pollutants related to this process, click on the specific pollutant in the list below.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information

Help

FINAL

RBLC ID: CA-1185
Corporate/Company: SANTA BARBARA AIRPORT
Facility Name: SANTA BARBARA AIRPORT
Process: Boiler, Forced Dratf

Primary Fuel: Natural gas
Throughput: 3.00 MMBTU/H
Process Code: 13.310

Pollutant Information - List of Pollutants

Help

Pollutant	Primary Emission Limit	Basis	Verified
Carbon Monoxide	100.0000 PPMVD@3% O2	OTHER CASE-BY-CASE	UNKNOWN
Nitrogen Oxides (NOx)	12.0000 PPMVD@3% O2	OTHER CASE-BY-CASE	UNKNOWN

Process Notes:

Technology Transfer Network

Facility Information

To learn more about the processes associated with this facility, click the Process List button. You can then view pollutant information for each process.

RBLC Home | New Search | Search Results | Facility Information | Process List

Help

Date Entered:04/23/2012 **Date Last Modified:09/06/2012**

FINAL

RBLC ID: CA-1185
Corporate/Company: SANTA BARBARA AIRPORT
Facility Name: SANTA BARBARA AIRPORT
Facility Description:

State: CA **Zip Code:** 93117
County: SANTA BARBARA **Country:** USA
EPA Region: 9

Facility Contact Information:

Name:
Phone: **E-Mail:**

Agency Contact Information:

Agency: CA033 - SANTA BARBARA COUNTY APCD, CA

EXIT Disclaimer | Agency Link

Contact: MR. BEN ELLENBERGER
Address: SANTA BARBARA COUNTY AIR
POLLUTION CONTROL DISTRICT
260 NORTH SAN ANTONIO RD.
SUITE A.
SANTA BARBARA, CA 93110-1315
Phone: (805) 961-8879
Other Agency Contact Info: 805-961-8800.
cbe@sbcapcd.org

Permit Number: ATC 13623

Permit Type: B: Add new process to existing facility

PERMIT URL:

EST/ACT DATE
Complete Application Date: ACT 03/11/2011
Permit Issuance Date: ACT 06/07/2011
FRS Number: 110038091962
SIC Code: 4581
NAICS Code: 488119

Affected Class I / U.S. Border Area:

No affected Class 1 areas identified.

Facility-Wide Emission Increase/Decrease:
(After prevention/control measures)

No facilitywide emissions data available for this facility.

Other Permitting Information:

Process Information - Details

For information about the pollutants related to this process, click on the specific pollutant in the list below.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information

Help

FINAL

RBLC ID: CA-1189
Corporate/Company: PETROROCK- TUNNELL LEASE
Facility Name: PETROROCK- TUNNELL LEASE
Process: Boiler

Primary Fuel: Propane, field gas, PUC natural gas
Throughput: 2.00 MMBTU/H
Process Code: 13.310

Pollutant Information - List of Pollutants

Help

Pollutant	Primary Emission Limit	Basis	Verified
Nitrogen Oxides (NOx)	20.0000 PPMVD@3% O2	OTHER CASE-BY-CASE	UNKNOWN

Process Notes: Oilfield tank heater

Technology Transfer Network

Facility Information

To learn more about the processes associated with this facility, click the Process List button. You can then view pollutant information for each process.

RBLC Home | New Search | Search Results | Facility Information | Process List

Help

Date Entered:04/23/2012 **Date Last Modified:09/06/2012**

FINAL

RBLC ID: CA-1189
Corporate/Company: PETROROCK- TUNNELL LEASE
Facility Name: PETROROCK- TUNNELL LEASE
Facility Description:

State: CA **Zip Code:** 93454
County: SANTA BARBARA **Country:** USA
EPA Region: 9

Facility Contact Information:

Name:
Phone: **E-Mail:**

Agency Contact Information:

Agency: CA033 - SANTA BARBARA COUNTY APCD, CA EXIT Disclaimer Agency Link
Contact: MR. BEN ELLENBERGER
Address: SANTA BARBARA COUNTY AIR
POLLUTION CONTROL DISTRICT
260 NORTH SAN ANTONIO RD.
SUITE A.
SANTA BARBARA, CA 93110-1315
Phone: (805) 961-8879
Other Agency Contact Info:

Permit Number: ATC- 12949-01 (2)

Permit Type: B: Add new process to existing facility

PERMIT URL:

	EST/ACT DATE
Complete Application Date:	ACT 03/07/2011
Permit Issuance Date:	ACT 01/24/2012
FRS Number:	Not Available
SIC Code:	1311
NAICS Code:	211111

Affected Class I / U.S. Border Area:

No affected Class 1 areas identified.

Facility-Wide Emission Increase/Decrease:
(After prevention/control measures)

No facilitywide emissions data available for this facility.

Other Permitting Information:

Process Information - Details

For information about the pollutants related to this process, click on the specific pollutant in the list below.

Help

FINAL

RBLC ID: CA-1190
Corporate/Company: PETROROCK- TUNNELL LEASE
Facility Name: PETROROCK- TUNNELL LEASE
Process: Heater

Primary Fuel: Propane, field gas, PUC natural gas
Throughput: 3.00 MMBTU/H
Process Code: 13.310

Pollutant Information - List of Pollutants

Help

Pollutant	Primary Emission Limit	Basis	Verified
Nitrogen Oxides (NOx)	12.0000 PPMVD@3% O2	OTHER CASE-BY-CASE	UNKNOWN

Process Notes:

Technology Transfer Network

Facility Information

To learn more about the processes associated with this facility, click the Process List button. You can then view pollutant information for each process.

RBLC Home | New Search | Search Results | Facility Information | Process List

Help

Date Entered:04/23/2012 **Date Last Modified:09/06/2012**

FINAL

RBLC ID: CA-1190
Corporate/Company: PETROROCK- TUNNELL LEASE
Facility Name: PETROROCK- TUNNELL LEASE
Facility Description:

State: CA
County: SANTA BARBARA
EPA Region: 9
Zip Code: 93454
Country: USA

Facility Contact Information:

Name:
Phone:
E-Mail:

Agency Contact Information:

Agency: CA033 - SANTA BARBARA COUNTY APCD, CA
Ext Disclaimer | Agency Link
Contact: MR. BEN ELLENBERGER
Address: SANTA BARBARA COUNTY AIR
POLLUTION CONTROL DISTRICT
260 NORTH SAN ANTONIO RD.
SUITE A.
SANTA BARBARA, CA 93110-1315
Phone: (805) 961-8879
Other Agency Contact Info: 805-961-8800

Permit Number: ATC- 12949-01 (3)

EST/ACT DATE
Complete Application Date: ACT 03/07/2011
Permit Issuance Date: ACT 01/24/2012

Permit Type: B: Add new process to existing facility

FRS Number: Not Available
SIC Code: 1311
NAICS Code: 211111

PERMIT URL:

Affected Class I / U.S. Border Area:

No affected Class 1 areas identified.

Facility-Wide Emission Increase/Decrease:
(After prevention/control measures)

No facilitywide emissions data available for this facility.

Other Permitting Information:

https://cfpub.epa.gov/rblc/index.cfm?action=PermitDetail.ProcessInfo&facility_id=26743&PROCESS_ID=106333
Last updated on 4/8/2016

Technology Transfer Network
Clean Air Technology Center RACT/BACT/LAER Clearinghouse

Process Information - Details

For information about the pollutants related to this process, click on the specific pollutant in the list below.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information

Help

FINAL

RBLC ID: NV-0046
Corporate/Company: KERN RIVER GAS TRANSMISSION COMPANY
Facility Name: GOODSPRINGS COMPRESSOR STATION
Process: COMMERCIAL/INSTITUTIONAL BOILER

Primary Fuel: NATURAL GAS
Throughput: 3.85 MMBTU/H
Process Code: 13.310

Pollutant Information - List of Pollutants

Help

Pollutant	Primary Emission Limit	Basis	Verified
Carbon Monoxide	0.0830 LB/MMBTU	BACT-PSD	YES
Nitrogen Oxides (NOx)	0.1010 LB/MMBTU	BACT-PSD	YES
Particulate matter, filterable < 10 µ (FPM10)	0.0078 LB/MMBTU	BACT-PSD	YES
Sulfur Dioxide (SO2)	0.0026 LB/MMBTU	BACT-PSD	YES
Volatile Organic Compounds (VOC)	0.0052 LB/MMBTU	BACT-PSD	NO

Process Notes: THE UNIT'S MODEL IDENTIFICATION IS PEERLESS 724 FDA WU.

Technology Transfer Network

Facility Information

To learn more about the processes associated with this facility, click the Process List button. You can then view pollutant information for each process.

RBLC Home | New Search | Search Results | Facility Information | Process List

Help

Date Entered:12/03/2007 **Date Last Modified:12/03/2007**

FINAL

RBLC ID: NV-0046
Corporate/Company: KERN RIVER GAS TRANSMISSION COMPANY
Facility Name: GOODSPRINGS COMPRESSOR STATION
Facility Description: THE FACILITY IS A COMPRESSOR STATION ON AN INTER-STATE PIPELINE FOR TRANSPORTING NATURAL GAS. THE FACILITY IS A MAJOR STATIONARY SOURCE FOR NITROGEN OXIDES IN A NON-ATTAINMENT AREA FOR OZONE AIR QUALITY.

State: NV
County: CLARK
EPA Region: 9
Zip Code: 89019
Country: USA

Facility Contact Information:

Name: DAVE DAHL
Phone: 7026393600
E-Mail:

Agency Contact Information:

Agency: NV002 - CLARK CO. DEPT. OF AIR QUALITY
EXIT Disclaimer Agency Link
Contact: MR. SANTOSH MATHEW
Address: AIR QUALITY SUPERVISOR
DEPARTMENT OF AIR QUALITY, CLARK COUNTY
4701 WEST RUSSELL ROAD, SUITE 200
LAS VEGAS, NV 89118
Phone: (702)455-5942
Other Agency Contact Info: RBLC COORDINATOR: DAVID LEE, TEL: 602-455-1673

Permit Number: 468

EST/ACT DATE
Complete Application Date: ACT 06/05/2002
Permit Issuance Date: ACT 05/16/2006

Permit Type: A: New/Greenfield Facility

FRS Number: 110006825294
SIC Code: 4922
NAICS Code: 486210

PERMIT URL:

Affected Class I / U.S. Border Area:

Distance to Area	Area Name
Between 100km and 250km	Grand Canyon NP, AZ

Facility-Wide Emission Increase/Decrease:
(After prevention/control measures)

Pollutant	Increase (+)/Decrease (-), Tons/Year
Carbon Monoxide	51.4300
Nitrogen Oxides (NOx)	130.4700
Particulate Matter (PM)	9.5000
Sulfur Oxides (SOx)	4.8500
Volatile Organic Compounds (VOC)	9.9200

Other Permitting Information:

THE FACILITY WAS INITIALLY PERMITTED ON OCTOBER 23, 1991 AS A NON-MAJOR STATIONARY SOURCE CONSISTING OF ONLY ONE GAS-FIRED TURBINE COMPRESSOR RATED AT 11,000 HP. ON MARCH 29, 2001, A PERMIT WAS ISSUED TO THE FACILITY FOR REPLACING THE ORIGINAL COMPRESSOR WITH A LARGER ONE RATED AT 15,000 HP. ON JUNE 5, 2002, THE FACILITY OWNER APPLIED FOR A MAJOR-SOURCE PERMIT, WHICH WAS FOR CONSTRUCTING TWO ADDITIONAL COMPRESSORS OF THE SAME MODEL. AN INITIAL PERMIT FOR AUTHORITY TO CONSTRUCT WAS ISSUED ON MAY 11, 2004. AN AMENDED AUTHORITY TO CONSTRUCT/OPERATING PERMIT WAS ISSUED ON MAY 16, 2006. THIS REPORT IS BASED ON THE BACT DETERMINATIONS CONTAINED IN THE PERMITS FOR MAY 11, 2004 AND MAY 16, 2006. A PART 70 OPERATING PERMIT WILL BE ISSUED IN THE NEAR FUTURE.

Process Information - Details

For information about the pollutants related to this process, click on the specific pollutant in the list below.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information

Help

FINAL

RBLC ID: NV-0048
Corporate/Company: KERN RIVER GAS TRANSMISSION COMPANY
Facility Name: GOODSPRINGS COMPRESSOR STATION
Process: COMMERCIAL/INSTITUTIONAL-SIZE BOILER (<100 MMBTU/H)

Primary Fuel: NATURAL GAS
Throughput: 3.85 MMBTU/H
Process Code: 13.310

Pollutant Information - List of Pollutants

Help

Pollutant	Primary Emission Limit	Basis	Verified
Carbon Monoxide	0.0830 LB/MMBTU	Other Case-by-Case	UNKNOWN
Nitrogen Oxides (NOx)	0.1000 LB/MMBTU	Other Case-by-Case	UNKNOWN
Particulate matter, filterable < 10 µ (FPM10)	0.0078 LB/MMBTU	Other Case-by-Case	UNKNOWN
Sulfur Dioxide (SO2)	0.0015 LB/MMBTU	BACT-PSD	UNKNOWN
Volatile Organic Compounds (VOC)	0.0050 LB/MMBTU	Other Case-by-Case	UNKNOWN

Process Notes: THE PROCESS CONSISTS OF ONE PEERLESS BOILER. THE BOILER IS ALLOWED TO OPERATE 8,760 HOURS PER YEAR.

Technology Transfer Network

Facility Information

To learn more about the processes associated with this facility, click the Process List button. You can then view pollutant information for each process.

RBLC Home | New Search | Search Results | Facility Information | Process List

Help

Date Entered:12/15/2008 **Date Last Modified:02/10/2009**

FINAL

RBLC ID: NV-0048
Corporate/Company: KERN RIVER GAS TRANSMISSION COMPANY
Facility Name: GOODSPRINGS COMPRESSOR STATION
Facility Description: THE FACILITY CONSISTS OF THREE SIMPLE-CYCLE GAS TURBINES, WHICH PUMP NATURAL GAS THROUGH THE INTERSTATE PIPELINE. EACH TURBINE IS RATED 15,000 HORSE POWER (HP).

State: NV **Zip Code:** 89019
County: CLARK COUNTY **Country:** USA
EPA Region: 9

Facility Contact Information:

Name: LARRY D. LEONARD
Phone: 8019376154 **E-Mail:**

Agency Contact Information:

Exit Disclaimer | Agency Link

Agency: NV002 - CLARK CO. DEPT. OF AIR QUALITY
Contact: MR. SANTOSH MATHEW
Address: AIR QUALITY SUPERVISOR
DEPARTMENT OF AIR QUALITY, CLARK COUNTY
4701 WEST RUSSELL ROAD, SUITE 200
LAS VEGAS, NV 89118
Phone: (702) 455-5942
Other Agency Contact Info: DAVID C. LEE, RBLC COORDINATOR
TEL: 702-455-1673

Permit Number: 468

EST/ACT DATE
Complete Application Date: ACT 03/23/2006
Permit Issuance Date: ACT 05/16/2006

Permit Type: A: New/Greenfield Facility

FRS Number: UNKNOWN
SIC Code: 4922
NAICS Code: 486210

PERMIT URL:

Affected Class I / U.S. Border Area:

Distance to Area	Area Name
Between 100km and 250km	Grand Canyon NP, AZ

Facility-Wide Emission Increase/Decrease:
(After prevention/control measures)

Pollutant	Increase (+)/Decrease (-), Tons/Year
Carbon Monoxide	51.4300
Nitrogen Oxides (NOx)	130.4700
Particulate Matter (PM)	9.5000
Sulfur Oxides (SOx)	4.8500
Volatile Organic Compounds (VOC)	9.9200

Other Permitting Information:

THIS REPORT IS BASED ON THE AUTHORITY TO CONSTRUCT/OPERATING PERMIT, AMENDMENT 1 (AMENDED ATC/OP) ISSUED TO KERN RIVER GAS TRANSMISSION COMPANY (KERN RIVER) ON MAY 16, 2006. BASED ON THE AMENDED ATC/OP, A PART 70 OPERATING PERMIT WAS COMPOSED AND ISSUED TO KERN RIVER ON JANUARY 28, 2008. THE STATIONARY SOURCE COMMENCED INITIAL CONSTRUCTION IN 1991, AND EXPANDED THEREAFTER. THE MAJOR-SOURCE THRESHOLD AT THE FACILITY'S LOCATION IS 50 TONS PER YEAR FOR NITROGEN OXIDES. ON MAY 1, 2003, THE FACILITY COMMENCED OPERATION AS A MAJOR SOURCE FOR NITROGEN OXIDES, AND A MINOR SOURCE FOR ALL THE OTHER CRITERIA AIR POLLUTANTS. IN MAY 2008, KERN RIVER PROVIDED UPDATE OF COMPANY'S NEW RESPONSIBLE OFFICIAL FOR ALL COMPLIANCE MATTERS.

https://cfpub.epa.gov/rblc/index.cfm?action=PermitDetail.ProcessInfo&facility_id=27043&PROCESS_ID=107319
Last updated on 4/8/2016

Technology Transfer Network
Clean Air Technology Center - RACT/BACT/LAER Clearinghouse
EPA Home | OAQPS | Air & Radiation | TTN Web | Technology Transfer Network | Clean Air Technology Center
RACT/BACT/LAER Clearinghouse | RBLC Basic Search | RBLC Search Results | Process Information - Details

Process Information - Details

For information about the pollutants related to this process, click on the specific pollutant in the list below.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information

Help

FINAL

RBLC ID: NV-0050
Corporate/Company: MGM MIRAGE
Facility Name: MGM MIRAGE
Process: BOILER - UNIT BE111 AT BELLAGIO

Primary Fuel: NATURAL GAS
Throughput: 2.10 MMBTU/H
Process Code: 11.310

Pollutant Information - List of Pollutants

Help

Pollutant	Primary Emission Limit	Basis	Verified
Carbon Monoxide	0.0380 LB/MMBTU	LAER	YES
Nitrogen Oxides (NOx)	0.0240 MMBTU	Other Case-by-Case	YES
Particulate matter, filterable < 10 µ (FPM10)	0.0095 LB/MMBTU	LAER	YES
Sulfur Oxides (SOx)	0.0048 LB/MMBTU	BACT-PSD	YES
Volatile Organic Compounds (VOC)	0.0048 LB/MMBTU	Other Case-by-Case	YES

Process Notes: THE UNIT IS A HURST SERIES 400 BOILER. THE UNIT IS ALLOWED TO OPERATE 24 HOURS/DAY AND 8,760 HOURS/YEAR. THE EMISSION LIMITS ARE BASED ON THE ATC PERMIT FOR MODIFICATION #13 DATED NOVEMBER 30, 2009.

Process Information - Details

For information about the pollutants related to this process, click on the specific pollutant in the list below.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information

Help

FINAL

RBLC ID: NV-0050
Corporate/Company: MGM MIRAGE
Facility Name: MGM MIRAGE
Process: BOILERS - UNITS CC004, CC005, AND CC006 AT CITY CENTER

Primary Fuel: NATURAL GAS
Throughput: 4.20 MMBTU/H
Process Code: 11.310

Pollutant Information - List of Pollutants

Help

Pollutant	Primary Emission Limit	Basis	Verified
Carbon Monoxide	0.0214 LB/MMBTU	LAER	NO
Hazardous Air Pollutants (HAP)	0.0019 LB/MMBTU	Other Case-by-Case	YES
Nitrogen Oxides (NOx)	0.0143 LB/MMBTU	Other Case-by-Case	NO
Particulate matter, filterable < 10 µ (FPM10)	0.0071 LB/MMBTU	Other Case-by-Case	NO
Sulfur Oxides (SOx)	0.0024 LB/MMBTU	BACT-PSD	NO
Volatile Organic Compounds (VOC)	0.0048 LB/MMBTU	Other Case-by-Case	YES

Process Notes: THE THREE UNITS ARE IDENTICAL HURST BOILERS, EACH OF WHICH IS RATED AT 4.2 MMBTU/HR. EACH OF THESE EMISSION UNITS IS ALLOWED TO OPERATE 24 HOURS/DAY AND UP TO 5,800 HOURS/YEAR. THE EMISSION LIMITS ARE BASED ON THE ATC PERMIT FOR MODIFICATION #8 DATED MARCH 30, 2006.

Process Information - Details

For information about the pollutants related to this process, click on the specific pollutant in the list below.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information

Help

FINAL

RBLC ID: NV-0050
Corporate/Company: MGM MIRAGE
Facility Name: MGM MIRAGE
Process: BOILER - UNIT MB090 AT MANDALAY BAY

Primary Fuel: NATURAL GAS
Throughput: 4.30 MMBTU/H
Process Code: 11.310

Pollutant Information - List of Pollutants

Help

Pollutant	Primary Emission Limit	Basis	Verified
Carbon Monoxide	0.0362 LB/MMBTU	LAER	YES
Hazardous Air Pollutants (HAP)	0.0018 LB/MMBTU	Other Case-by-Case	YES
Nitrogen Oxides (NOx)	0.0140 LB/MMBTU	Other Case-by-Case	UNKNOWN
Particulate matter, filterable < 10 µ (FPM10)	0.0070 LB/MMBTU	Other Case-by-Case	YES
Sulfur Oxides (SOx)	0.0006 LB/MMBTU	BACT-PSD	YES
Volatile Organic Compounds (VOC)	0.0054 LB/MMBTU	Other Case-by-Case	YES

Process Notes: THE UNIT IS A HURST SCOTCH MARINE "WETBACK 400 SERIES" BOILER. THE EMISSION LIMITS REPORTED HEREIN ARE BASED ON THE ATC FOR MODIFICATION #11 DATED NOVEMBER 16, 2006. THE UNIT IS ALLOWED TO OPERATE 24 HOURS/DAY AND 8,760 HOURS/YEAR.

Technology Transfer Network

Facility Information

To learn more about the processes associated with this facility, click the Process List button. You can then view pollutant information for each process.

RBLC Home | New Search | Search Results | Facility Information | Process List

Help

Date Entered:02/16/2010 **Date Last Modified:03/15/2010**

FINAL

RBLC ID: NV-0050
Corporate/Company: MGM MIRAGE
Facility Name: MGM MIRAGE
Facility Description: THE FACILITY IS A MAJOR SOURCE FOR CO, NOX, PM-10, AND A NON-MAJOR SOURCE FOR SO2, VOC, AND HAP. THE FACILITY IS A CONGLOMERATE OF HOTELS AND CASINOS LOCATED IN A CONTIGUOUS AREA, WHICH AIR QUALITY IS NON-ATTAINMENT FOR CO, OZONE, AND PM-10, AND ATTAINMENT FOR THE OTHER CRITERIA AIR POLLUTANTS.

State: NV
County: CLARK
EPA Region: 9
Zip Code: 89109
Country: USA

Facility Contact Information:

Name: CINDY ORTEGA
Phone: 7026506765
E-Mail:

Agency Contact Information:

Agency: NV002 - CLARK CO. DEPT. OF AIR QUALITY
EXIT Disclaimer Agency Link
Contact: MR. SANTOSH MATHEW
Address: AIR QUALITY SUPERVISOR
DEPARTMENT OF AIR QUALITY, CLARK COUNTY
4701 WEST RUSSELL ROAD, SUITE 200
LAS VEGAS, NV 89118
Phone: (702) 455-5942
Other Agency Contact Info: DAVID C. LEE, RBLC COORDINATOR, 702-455-1673

Permit Number: 825

EST/ACT DATE
Complete Application Date: ACT 05/22/2008
Permit Issuance Date: ACT 11/30/2009

Permit Type: A: New/Greenfield Facility
FRS Number: UNKNOWN
SIC Code: 701
NAICS Code: 721120

PERMIT URL:

Affected Class I / U.S. Border Area:

Distance to Area	Area Name
Between 100km and 250km	Grand Canyon NP, AZ

Facility-Wide Emission Increase/Decrease:
(After prevention/control measures)

Pollutant	Increase (+)/Decrease (-), Tons/Year
Carbon Monoxide	197.4400
Nitrogen Oxides (NOx)	153.3800
Particulate Matter (PM)	79.5900
Sulfur Oxides (SOx)	4.4200
Volatile Organic Compounds (VOC)	48.9000

Other Permitting Information:

THE FACILITY IS A CONGLOMERATE OF TEN BUSINESS ENTITIES, WHICH ARE: (1) MGM GRAND, (2) NEW YORK-NEW YORK, (3) MANDALAY BAY, (4) LUXOR, (5) EXCALIBUR, (6) BELLAGIO, AND (7) CITY CENTER, (8) SIGNATURE (THE RESIDENCES), (9) MONTE CARLO, AND (10) FOUR SEASONS. ALL OF THESE ENTITIES ARE IN A CONTIGUOUS PROPERTY AND HAD BEEN PERMITTED INDIVIDUALLY PRIOR TO THE ACQUISITION PROCESS BEGINNING FROM 2005. THE FACILITY BECAME A MAJOR STATIONARY SOURCE FOR CO WHEN THE ATC FOR MODIFICATION #8 WAS ISSUED ON MARCH 30, 2006. MODIFICATION #8 CONSISTED OF CONSTRUCTING THE NEW CITY CENTER, WHICH COMMENCED OPERATION IN DECEMBER 2009. ALL EMISSION UNITS PERMITTED ON OR AFTER MARCH 30, 2006 ARE CONSIDERED NEW FOR THIS REPORT.

Process Information - Details

For information about the pollutants related to this process, click on the specific pollutant in the list below.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information

Help

FINAL

RBLC ID: WA-0316
Corporate/Company: NORTHWEST PIPELINE CORP.
Facility Name: NORTHWEST PIPELINE CORP.-MT VERNON COMPRESSOR
Process: BOILER, NATURAL GAS

Primary Fuel: NATURAL GAS
Throughput: 4.19 MMBTU/H
Process Code: 13.310

Pollutant Information - List of Pollutants

Help

Pollutant	Primary Emission Limit	Basis	Verified
Nitrogen Oxides (NOx)	34.0000 PPMDV @ 3% O2	BACT-PSD	UNKNOWN

Process Notes: Sellers C100 heater/boiler

Technology Transfer Network

Facility Information

To learn more about the processes associated with this facility, click the Process List button. You can then view pollutant information for each process.

RBLC Home | New Search | Search Results | Facility Information | Process List

Help

Date Entered:03/11/2004 **Date Last Modified:06/04/2009**

FINAL

RBLC ID: WA-0316
Corporate/Company: NORTHWEST PIPELINE CORP.
Facility Name: NORTHWEST PIPELINE CORP.-MT VERNON COMPRESSOR
Facility Description: NATURAL GAS TRANSMISSION STATION

State: WA
County: SKAGIT
EPA Region: 10
Zip Code: 841580900
Country: USA

Facility Contact Information:

Name:
Phone:
E-Mail:

Agency Contact Information:

Agency: WA001 - WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECY); AIR QUALITY PROGRAM
EXIT Disclaimer | Agency Link
Contact: MR. MARC CROOKS
Address: WASHINGTON STATE DEPT. OF ECOLOGY
PO BOX 47600
OLYMPIA, WA 98504-7600
Phone: (360)407-6803
Other Agency Contact Info: DAN MEYER
1200 6TH AVENUE
SEATTLE, WA 98101
206-553-4150

Permit Number: PSD-01-09 AMENDMENT 5

EST/ACT DATE
Complete Application Date:
Permit Issuance Date: ACT 06/14/2006

Permit Type: D: Both B (Add new process to existing facility) & C (Modify process at existing facility)

FRS Number: 110017421841
SIC Code: 4923
NAICS Code: 486210

PERMIT URL:

Affected Class I / U.S. Border Area:

Distance to Area	Area Name
Less than 100km	US/Canada Border,
Less than 100km	North Cascades NP, WA
Between 100km and 250km	Alpine Lakes, WA
Between 100km and 250km	Glacier Peak, WA
Between 100km and 250km	Olympic NP, WA
Between 100km and 250km	Pasayten, WA

Facility-Wide Emission Increase/Decrease:
(After prevention/control measures)

No facilitywide emissions data available for this facility.

Other Permitting Information:

MODIFICATION ADDS 1 MARS 90S TURBINE, 1 CENTAUR 50S, REPLACING AN EXISTING STANDBY GENERATOR WITH A 450 KW GENERATOR, AND REPLACING AN EXISTING BOILER WITH A 4.186 MMBTU/H BOILER. ONLY NOX IS SUBJECT TO PSD REVIEW. THE AMENDMENTS DID NOT AFFECT EMISSIONS LEVELS, BACT DETERMINATIONS, OR MEODELING RESULTS.

Attachment B

Review of BACT Determinations published by CARB

List of BACT determinations published in CARB's BACT Clearinghouse for boilers ≥ 2 MMBtu/hr to < 5 MMBtu/hr:

Capacity MMBtu/hr	Source	Date	Type	NOx ppmv @ 3% O_2	CO ppmv @ 3% O_2	VOC lbs/MMBtu	Filterable PM10 lbs/MMBtu	SO_2 lbs/MMBtu
3.00	SANTA BARBARA COUNTY APCD	6/7/2011	Non-Atmospheric	12	100	NA	NA	NA
2.00	SANTA BARBARA COUNTY APCD	1/24/2012	Not Specified	20	NA	NA	NA	NA
4.2	SOUTH COAST AQMD	5/1/2000	Not Specified	2	NA	NA	NA	NA

= The determination noted that the SCAQMD does not consider this standard achieved in practice.

= Selected as the most stringent BACT determination achieved in practice.

California Environmental Protection Agency
Air Resources Board

BACT Determination Detail

Category

Source Category:	Boiler: < 5 MMBtu/hr
SIC Code	4581
NAICS Code	48811

Emission Unit Information

Manufacturer:	Cleaver-Brooks
Type:	
Model:	FLX700-300-160HW
Equipment Description:	Forced draft boiler
Capacity / Dimentions	3.00 MMBtu/hr
Fuel Type	Natural Gas
Multiple Fuel Types	
	Continuous (24/7/52)

Operating Schedule (hours/day)/(days/week)/ (weeks/year)e	
Function of Equipment	

Bact Information

NOx Limit	12
NOx Limit Units	ppmvd @ 3% O2
NOx Average Time	40 minutes
NOx Control Method	Pollution Prevention
NOx Control Method Desc	Forced draft, full modulation, flue gas recirculation
NOx Percent Control Efficiency	
NOx Cost Effectiveness (%/ton)	
NOx Incremental Cost Effectiveness (%/ton)	
NOx Cost Verified (Y/N)	
NOx Dollar Year	
CO Limit	100
CO Limit Units	ppmvd @ 3% O2
CO Average Time	40 minutes

CO Control Method	Pollution Prevention
CO Control Method Desc	Forced draft, full modulation, flue gas recirculation
CO Percent Control Efficiency	
CO Cost Effectiveness (%/ton)	
CO Incremental Cost Effectiveness (%/ton)	
CO Cost Verified (Y/N)	
CO Dollar Year	

Project / Permit Information

Application/Permit No.:	ATC 13623
Application Completeness Date:	
New Construction/Modification:	New Construction
ATC Date:	06-07-2011
PTO Date:	04-01-2012
Startup Date:	09-26-2011
Technology Status:	BACT Determination
Source Test Available:	Yes
Source Test Results:	Boiler 1: 9.7 ppmvd NOx @ 3% O2 53.6 ppmvd CO @ 3% O2 Boiler 2: 11.7 ppmvd NOx @ 3% O2 21.8 ppmvd CO @ 3% O2

Facility / District Information

Facility Name:	Santa Barbara Airport
Facility Zip Code:	93117
Facility County:	Santa Barbara
District Name:	Santa Barbara County APCD
District Contact:	Ben Ellenberger
Contact Phone No.:	(805) 961-8800
Contact E-Mail:	cbe@sbcapcd.org

Notes

Notes:	2 identical units. Tuning required twice per year with a portable CO/NOx analyzer.

Report Error In Determination

California Environmental Protection Agency
Air Resources Board

BACT Determination Detail

Category

Source Category:	Boiler: < 5 MMBtu/hr
SIC Code	1311
NAICS Code	211111

Emission Unit Information

Manufacturer:	Rite Engineering & Manufacturing
Type:	
Model:	W200WG
Equipment Description:	Hot Water Heater
Capacity / Dimentions	2.00 MMBtu/hr
Fuel Type	Field Gas
Multiple Fuel Types	Propane, Field Gas, PUC natural gas
	Continuous (24/7/52)

Operating Schedule (hours/day)/(days/week)/ (weeks/year)e	
Function of Equipment	Oilfield tank heater

Bact Information

NOx Limit	20
NOx Limit Units	ppmvd @ 3% O2
NOx Average Time	40 minutes
NOx Control Method	Pollution Prevention
NOx Control Method Desc	Low-Nox burner
NOx Percent Control Efficiency	
NOx Cost Effectiveness (%/ton)	
NOx Incremental Cost Effectiveness (%/ton)	
NOx Cost Verified (Y/N)	
NOx Dollar Year	

Project / Permit Information

Application/Permit No.:	ATC 12949-01 (2)
Application Completeness Date:	

New Construction/Modification:	New Construction
ATC Date:	01-24-2012
PTO Date:	
Startup Date:	01-31-2012
Technology Status:	BACT Determination
Source Test Available:	No
Source Test Results:	

Facility / District Information

Facility Name:	PetroRock - Tunnell Lease
Facility Zip Code:	93454
Facility County:	Santa Barbara
District Name:	Santa Barbara County APCD
District Contact:	Ben Ellenberger
Contact Phone No.:	(805) 961-8800
Contact E-Mail:	cbe@sbcapcd.org

Notes

Notes:

Report Error In Determination

California Environmental Protection Agency
Air Resources Board

BACT Determination Detail

Category

Source Category:	Boiler: < 5 MMBtu/hr
SIC Code	3552
NAICS Code	314

Emission Unit Information

Manufacturer:	Kewance
Type:	Fire tube
Model:	100 HP
Equipment Description:	
Capacity / Dimentions	4.2 MMBtu/hr
Fuel Type	Natural Gas
Multiple Fuel Types	
	Continuous (24/7/52)

Operating Schedule (hours/day)/(days/week)/ (weeks/year)e	
Function of Equipment	Steam Generator

Bact Information

NOx Limit	2
NOx Limit Units	ppmvd@3% O2
NOx Average Time	15-min
NOx Control Method	
NOx Control Method Desc	SCONOx Catalytic Absorption System
NOx Percent Control Efficiency	
NOx Cost Effectiveness (%/ton)	
NOx Incremental Cost Effectiveness (%/ton)	
NOx Cost Verified (Y/N)	
NOx Dollar Year	

Project / Permit Information

Application/Permit No.:	366323
Application Completeness Date:	

New Construction/Modification:	New Construction
ATC Date:	05-01-2000
PTO Date:	
Startup Date:	
Technology Status:	BACT Determination
Source Test Available:	No
Source Test Results:	

Facility / District Information

Facility Name:	Margaretis Textile Services/MTS Inc.
Facility Zip Code:	
Facility County:	
District Name:	South Coast AQMD
District Contact:	Martin Kay
Contact Phone No.:	909-396-3115
Contact E-Mail:	mkay@aqmd.gov

Notes

Notes:	The applicant requested 2 ppm NOx based on the guarantee of the control technology manufacture. At this time, 2 ppm NOx is not considered achieved in practice for this category of equipment.

Report Error In Determination

Attachment C

Review of BACT Determinations published by California Air Districts

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Best Available Control Technology (BACT) Guidelines for Non-Major Polluting Facilities*

10-20-2000 Rev. 0
10-03-2008 Rev. 1

Equipment or Process: Boiler

	Criteria Pollutants					
Subcategory/Rating/ Size	**VOC**	**NOx[1)]**	**SOx**	**CO**	**PM_{10}**	**Inorganic**
Natural Gas or Propane Fired, < 20 MM Btu/HR		≤ 12 ppmv dry corrected to 3% O_2[2)] (10-20-2000)	Natural Gas (10-20-2000)	≤50 ppmv for firetube type, ≤ 100 ppmv for watertube type, dry corrected to 3% O_2 (04-10-98)	Natural Gas (04-10-98)	
Natural Gas or Propane Fired, ≥ 20 MM Btu/HR		With Low-NOx Burner: ≤ 9 ppmv dry corrected to 3% O_2 With Add-On Controls: ≤ 7 ppmv dry corrected to 3% O_2 (10-20-2000)	Natural Gas (10-20-2000)	Same as above. (04-10-98)	Natural Gas (04-10-98)	With Add-On Controls: ≤ 5 ppmvd NH3, corrected to 3% O2 ≤ 1 ppmvd ozone, corrected to 3% O2 (10-20-2000)
Oil Fired[3)]		Compliance with AQMD Rule 1146 or 1146.1 (10-20-2000)	Sulfur Content ≤ 0.05% by Weight (10-20-2000) or .0015% by weight if purchased after May 31, 2004 (10-03-2008)	Same as above (10-20-2000)		
Landfill or Digester Gas Fired, < 75 MMBTU/Hr		≤ 30 ppmvd at 3% O_2 dry. (04-10-98)		≤ 100 ppmvd at 3% O_2 dry. (04-10-98)	≤ 0.1 gr/scf at 12% CO_2 (Rule 409) (04-10-98)	

* Means those facilities that are not major polluting facilities as defined by Rule 1302 - Definitions

REPLACED

SMAQMD BACT CLEARINGHOUSE

CATEGORY: **BOILER/HEATER < 5 MMBTU**

BACT Size: Minor Source BACT

BOILER (2-5 MMBtu/hr) - Non-atmospheric

BACT Determination Number: 61	**BACT Determination Date:** 3/15/2013

Equipment Information

Permit Number: N/A -- Generic BACT Determination

Equipment Description: BOILER (2-5 MMBtu/hr) - Non-atmospheric

Unit Size/Rating/Capacity: Small Boilers (2-5 MMBtu/hr) - Natural Gas

Equipment Location:

BACT Determination Information

ROCs	**Standard:**	
	Technology Description:	
	Basis:	
NOx	**Standard:**	9 ppmvd@3% O2
	Technology Description:	Low Nox Burner
	Basis:	Achieved in Pactice
SOx	**Standard:**	
	Technology Description:	
	Basis:	
PM10	**Standard:**	
	Technology Description:	
	Basis:	
PM2.5	**Standard:**	
	Technology Description:	
	Basis:	
CO	**Standard:**	400 ppmvd@3% O2
	Technology Description:	Burner technology with Nox control as a priority
	Basis:	Achieved in Pactice
LEAD	**Standard:**	
	Technology Description:	
	Basis:	

Comments: This generic BACT determination was created to reflect the current BACT standard in the SMAQMD permitting manual.

District Contact: Brian Krebs Phone No.: (916) 874 - 4856 email: bkrebs@airquality.org

REPLACED

SMAQMD BACT CLEARINGHOUSE

CATEGORY: **BOILER/HEATER < 5 MMBTU**

BACT Size: Minor Source BACT

BOILER (2-5 MMBtu/hr) - atmospheric

BACT Determination Number: 62	**BACT Determination Date:** 3/15/2013

Equipment Information

Permit Number: N/A -- Generic BACT Determination

Equipment Description: BOILER (2-5 MMBtu/hr) - atmospheric

Unit Size/Rating/Capacity: Small Boiler (2-5 MMBtu/hr), Atmospheric - NG

Equipment Location:

BACT Determination Information

ROCs	**Standard:**	
	Technology Description:	
	Basis:	
NOx	**Standard:**	12 ppmvd@3% O2
	Technology Description:	Burner technology
	Basis:	Achieved in Pactice
SOx	**Standard:**	
	Technology Description:	
	Basis:	
PM10	**Standard:**	
	Technology Description:	
	Basis:	
PM2.5	**Standard:**	
	Technology Description:	
	Basis:	
CO	**Standard:**	400 ppmvd@3% O2
	Technology Description:	Burner technology with Nox control as priority
	Basis:	Achieved in Pactice
LEAD	**Standard:**	
	Technology Description:	
	Basis:	

Comments: This generic BACT determination was created to reflect the current BACT standard in the SMAQMD permitting manua

District Contact: Brian Krebs Phone No.: (916) 874 - 4856 email: bkrebs@airquality.org

Printed: 5/5/2016

Attachment D

Cost Effectiveness Determinations for SRC

4.999 MMBtu/hr BOILER SCR COST EFFECTIVENESS CALCULATION

EPA AIR POLLUTION CONTROL COST MANUAL, Sixth Edition, EPA/452/B-02-001, January 2002
Section 4.2 - NOx Post-Combustion, Chapter 2 - Selective Catalytic Reduction

Cost Effectiveness = $ 33,533.73 $/ton

Equipment

Boiler rating		4.999	mmBTU/hr
Boiler Operating hours		8760	hours
Boiler capacity factor		1	
SCR Operating Days		365	days
Total Capacity Factor		1	
Baseline NOx (30 ppm)		0.0364	lb/mmBTU
SCR NOx (5 ppm)		0.006067	lb/mmBTU
Ammonia Slip		10	ppm
Ammonia Stoichiometric Ratio		1.05	
Stored Ammonia Conc		29	%
Ammonia Storage days		90	days
Sulfur Content		0.005	%
Pressure drop for SCR Ductwork		3	inches W.G.
Pressure drop for each Catalyst Layer		1	inch W.G.
Temperature at SCR Inlet		650	degrees F
Cost year		1998	
Equipment Life		20	years
Annual interest Rate		7	%
Catalyst cost, Initial		240	$/ft2
Catalyst cost, replacement		290	$/ft2
Electrical Power cost		0.05	$/KWh
Ammonia Cost		0.101	$/lb
Catalyst Life		24000	hr
Catalyst Layers	2 full, 1 empty		

Boiler Calculations

Q_B		4.999	mmBTU/hr
$q_{flue\ gas}$		1781.28066	acfm

N_{NOx}	0.833324176	

SCR Reactor Calculations

$Vol_{Catalyst}$	11.22514556	ft3
$A_{Catalyst}$	1.855500688	ft2
A_{SCR}	2.133825791	ft2
l=w=	1.460762058	ft
n_{layer}	2	
h_{layer}	4.024829263	
n_{total}	3	
h_{SCR}	42.07448779	ft

Reagent Calculations

$m_{reagent}$	0.07071902	lb/hr
m_{sol}	0.24385869	lb/hr
q_{sol}	0.032576908	gph
Tank Volume	70.36612171	gal

Cost Estimation

Direct Costs

DC	$	135,387.79

Indirect Costs

General Facilities	$	6,769.39
Engineering and home office fees	$	13,538.78
Process Contingency	$	6,769.39
Total Indirect Installation Costs	$	27,077.56
Project Contingency	$	24,369.80
Total Plant Cost	$	186,835.15
Preproduction Cost	$	3,736.70
Inventory Capital	$	53.20
Total Capital Investment	$	190,625.06

Direct Annual Costs

Maintenance Costs	$	2,859.38	per yr
Power		1.59060664	KW
Annual Electricity	$	696.69	per yr
Reagent Solution Cost	$	215.76	per yr

Catalyst Replacement

FWF		0.311051666	
Annual Catalyst Replacement	$	506.28	per yr
Total Variable Direct Cost	$	1,418.72	per yr
Total Direct Annual Cost	$	4,278.10	per yr
CRF		0.094392926	
Indirect Annual Cost	$	17,993.66	per yr
Total annual Cost	$	22,271.76	per yr
NOx Removed		0.66	tons
Cost of NOx removal	**$**	**33,533.73**	**per ton**

2 MMBtu/hr BOILER SCR COST EFFECTIVENESS CALCULATION

EPA AIR POLLUTION CONTROL COST MANUAL, Sixth Edition, EPA/452/B-02-001, January 2002
Section 4.2 - NOx Post-Combustion, Chapter 2 - Selective Catalytic Reduction

Cost Effectiveness = $ 45,163.99 $/ton

Equipment

Boiler rating	2	mmBTU/hr
Boiler Operating hours	8760	hours
Boiler capacity factor	1	
SCR Operating Days	365	days
Total Capacity Factor	1	
Baseline NOx (30 ppm)	0.0364	lb/mmBTU
SCR NOx (5 ppm)	0.006068	lb/mmBTU
Ammonia Slip	10	ppm
Ammonia Stoichiometric Ratio	1.05	
Stored Ammonia Conc	29	%
Ammonia Storage days	90	days
Sulfur Content	0.005	%
Pressure drop for SCR Ductwork	3	inches W.G.
Pressure drop for each Catalyst Layer	1	inch W.G.
Temperature at SCR Inlet	650	degrees F
Cost year	1998	
Equipment Life	20	years

Annual interest Rate	7	%
Catalyst cost, Initial	240	$/ft2
Catalyst cost, replacement	290	$/ft2
Electrical Power cost	0.05	$/KWh
Ammonia Cost	0.101	$/lb
Catalyst Life	24000	hr
Catalyst Layers	2 full, 1 empty	

Boiler Calculations

Q_B	2	mmBTU/hr
$q_{flue\ gas}$	712.6547952	acfm
N_{NOx}	0.833296703	

SCR Reactor Calculations

$Vol_{Catalyst}$	4.490844708	ft3
$A_{Catalyst}$	0.742348745	ft2
A_{SCR}	0.853701057	ft2
l=w=	0.923959445	ft
n_{layer}	2	
h_{layer}	4.024754025	
n_{total}	3	
h_{SCR}	42.07426207	ft

Reagent Calculations

$m_{reagent}$	0.028293267	lb/hr
m_{sol}	0.097562989	lb/hr
q_{sol}	0.01303337	gph
Tank Volume	28.1520791	gal

Cost Estimation

Direct Costs

DC	$74,233.09

Indirect Costs

General Facilities	$3,711.65
Engineering and home office fees	$7,423.31
Process Contingency	$3,711.65
Total Indirect Installation Costs	$14,846.62
Project Contingency	$13,361.96
Total Plant Cost	$102,441.67

Preproduction Cost	$2,048.83	
Inventory Capital	$21.28	
Total Capital Investment	$104,511.78	

Direct Annual Costs

Maintenance Costs	$1,567.68	per yr
Power	0.63636972	KW
Annual Electricity	$278.73	per yr
Reagent Solution Cost	$86.32	per yr

Catalyst Replacement

FWF	0.311051666	
Annual Catalyst Replacement	$202.55	per yr
Total Variable Direct Cost	$567.60	per yr
Total Direct Annual Cost	$2,135.27	per yr
CRF	0.094392926	
Indirect Annual Cost	$9,865.17	per yr
Total annual Cost	$12,000.45	per yr
NOx Removed	0.27	tons
Cost of NOx removal	**$45,163.99**	**per ton**