A table is provided at the end of this section showing the changes proposed for each emission unit associated with this project.

**Summary of Proposed BACT Emission Limits**

Based on the EPA recommended five-step, top-down process to determine BACT for GHG emissions, FHR is proposing the following as BACT emission limits:

| Source | Proposed Emission Controls | Proposed Emission Limit |
|---|---|---|
| Sat Gas No. 3 Hot Oil Heater | Implement energy efficient design and operating practices. The heater is designed for 92% efficiency. | 236,242 tons $CO_2e$ total per 365-days (rolling) |
| Mid Plant Cooling Tower No. 2 | Implement cooling tower monitoring program | Work practice standard |
| Equipment Leak Fugitives | Implement enhanced LDAR monitoring | Work practice standard |
| CCR Hot Oil Heater | Implement energy efficient design and operating practices. The heater is designed for 91% efficiency. | 63,193 tons $CO_2e$ total per 365-days (rolling) |
| Various Planned Maintenance, Start-up, and Shutdown Activities | Minimize GHG degassing emissions through good operational practices | Work practice standard |

| Pollutant | PSD Emissions Increase (tons/yr) | PSD Threshold (tons/yr) |
|---|---|---|
| Carbon Dioxide ($CO_2$) | 358,647 | N/A |
| Methane ($CH_4$) | 33 | N/A |
| Nitrous Oxide ($N_2O$) | 2 | N/A |
| Total GHG (mass basis) | 358,682 | 0 |
| $CO_2e$ | 359,991 | 75,000 |

# TABLE 2F
# PROJECT EMISSIONS INCREASE

| | | | |
|---|---|---|---|
| **Pollutant [1]:** | GHG (mass basis) | **Permit:** | N/A |
| **Baseline Period:** | 2011 **to** 2012 | | |

| | Affected or Modified Facilities [2] | | Permit NO. | Actual Emissions [3] (tons/yr) | Baseline Emissions [4] (tons/yr) | Proposed Emissions [5] (tons/yr) | Projected Actual Emissions (ton/yr) | Difference (A-B) [5] (tons/yr) | Correction [7] (ton/yr) | Project Increase [8] (tons/yr) |
|---|---|---|---|---|---|---|---|---|---|---|
| | FIN | EPN | | | B | A | | | | |
| 1 | SATGASHTR | SATGASHTR | N/A | 0 | 0 | 236009 | N/A | 236009 | N/A | 236009 |
| 2 | 39BA3901 | JJ-4 | N/A | 20374 | 20374 | 62894 | N/A | 42520 | N/A | 42520 |
| 3 | Various Boilers | Various Boilers | N/A | N/A | N/A | 50481 | N/A | 50481 | N/A | 50481 |
| 4 | 37BA2 | KK-3 | N/A | 11465 | 11465 | 37282 | N/A | 25817 | N/A | 25817 |
| 5 | 45BD3 | V-8 | N/A | N/A | N/A | 335 | N/A | 335 | N/A | 335 |
| 6 | LW-8 | VCS-1 | N/A | N/A | N/A | 3282 | N/A | 3282 | N/A | 3282 |
| 7 | F-SATGAS3 | F-SATGAS3 | N/A | 0.00 | 0.00 | 6.44 | N/A | 6.44 | N/A | 6.44 |
| 8 | 14-UDEX | F-14-UDEX | N/A | 0.00 | 0.00 | 0.01 | N/A | 0.01 | N/A | 0.01 |
| 9 | 37 | F-37 | N/A | 0.00 | 0.00 | 0.15 | N/A | 0.15 | N/A | 0.15 |
| 10 | 39 | F-39 | N/A | 0.00 | 0.00 | 0.06 | N/A | 0.06 | N/A | 0.06 |
| 11 | 40 | F-40 | N/A | 0.00 | 0.00 | 0.32 | N/A | 0.32 | N/A | 0.32 |
| 12 | 42 | F-42 | N/A | 0.00 | 0.00 | 0.91 | N/A | 0.91 | N/A | 0.91 |
| | | | | | | PAGE SUBTOTAL: [9] | | | | 358,452 |
| | | | | | | | | Total | | |

# TABLE 2F
# PROJECT EMISSIONS INCREASE

| | | | |
|---|---|---|---|
| **Pollutant [1]:** | GHG (mass basis) | **Permit:** | N/A |
| **Baseline Period:** | 2011 **to** 2012 | | |

| | Affected or Modified Facilities [2] | | Permit NO. | Actual EGissions (3) (tons/yr) | Baseline Emissions [4] (ton/yr) | Proposed Emissions [5] (tons/yr) | Projected Actual Emissions (ton/yr) | Difference (A-B) [5] (tons/yr) | Correction [7] (ton/yr) | Project Increase [8] (tons/yr) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | B | | A | | | | |
| | FIN | EPN | | | | | | | | |
| 13 | P-GB | F-GB | N/A | 0.00 | 0.00 | 0.04 | N/A | 0.04 | N/A | 0.04 |
| 14 | P-VOC | F-TK-VOC | N/A | 0.00 | 0.00 | 0.29 | N/A | 0.29 | N/A | 0.29 |
| 15 | 44EF2 | F-S-202 | N/A | 0.00 | 0.00 | 0.55 | N/A | 0.55 | N/A | 0.55 |
| 16 | 08FB142 | FB142 | N/A | N/A | N/A | 1.33 | N/A | 1.33 | N/A | 1.33 |
| 17 | 08FB147 | FB147 | N/A | | | | | | | |
| 18 | 08FB137 | FB137 | N/A | | | | | | | |
| 19 | 40FB4010 | FB4010 | N/A | | | | | | | |
| 20 | 40FB4011 | FB4011 | N/A | | | | | | | |
| 21 | MSSFUGS-DC | MSSFUGS-DC | N/A | 0.00 | 0.00 | 228 | N/A | 228 | N/A | 228 |
| 22 | | | | | | | | | | |
| 23 | | | | | | | | | | |
| 24 | | | | | | | | | | |
| | | | | | | | PAGE SUBTOTAL: [9] | | | 230 |
| | | | | | | | | Total | | 358,682 |

# TABLE 2F
# PROJECT EMISSIONS INCREASE

| | | | |
|---|---|---|---|
| **Pollutant [1]:** | $CO_2e$ | **Permit:** | N/A |
| **Baseline Period:** | 2011 **to** 2012 | | |

| | Affected or Modified Facilities [2] | | Permit NO. | Actual Emissions [3] (tons/yr) | Baseline Emissions [4] (tons/yr) | Proposed Emissions [5] (tons/yr) | Projected Actual Emissions (ton/yr) | Difference (A-B) [5] (tons/yr) | Correction [7] (ton/yr) | Project Increase [8] (tons/yr) |
|---|---|---|---|---|---|---|---|---|---|---|
| | FIN | EPN | | | B | A | | | | |
| 1 | SATGASHTR | SATGASHTR | N/A | 0 | 0 | 236242 | N/A | 236242 | N/A | 236242 |
| 2 | 39BA3901 | JJ-4 | N/A | 20484 | 20484 | 63193 | N/A | 42709 | N/A | 42709 |
| 3 | Various Boilers | Various Boilers | N/A | N/A | N/A | 50713 | N/A | 50713 | N/A | 50713 |
| 4 | 37BA2 | KK-3 | N/A | 11523 | 11523 | 37454 | N/A | 25930 | N/A | 25930 |
| 5 | 45BD3 | V-8 | N/A | N/A | N/A | 362 | N/A | 362 | N/A | 362 |
| 6 | LW-8 | VCS-1 | N/A | N/A | N/A | 3551 | N/A | 3551 | N/A | 3551 |
| 7 | F-SATGAS3 | F-SATGAS3 | N/A | 0 | 0 | 161 | N/A | 161 | N/A | 161 |
| 8 | 14-UDEX | F-14-UDEX | N/A | 0 | 0 | 0.2 | N/A | 0.2 | N/A | 0.2 |
| 9 | 37 | F-37 | N/A | 0 | 0 | 4 | N/A | 4 | N/A | 4 |
| 10 | 39 | F-39 | N/A | 0 | 0 | 1 | N/A | 1 | N/A | 1 |
| 11 | 40 | F-40 | N/A | 0 | 0 | 8 | N/A | 8 | N/A | 8 |
| 12 | 42 | F-42 | N/A | 0 | 0 | 23 | N/A | 23 | N/A | 23 |
| | | | | | | PAGE SUBTOTAL: [9] | | | | 359706 |
| | | | | | | | | Total | | |

# TABLE 2F
# PROJECT EMISSIONS INCREASE

| | | | |
|---|---|---|---|
| **Pollutant [1]:** | $CO_2e$ | **Permit:** | N/A |
| **Baseline Period:** | 2011 **to** 2012 | | |

| | Affected or Modified Facilities [2] | | Permit NO. | Actual Emissions [3] (tons/yr) | Baseline Emissions [4] (ton/yr) | Proposed Emissions [5] (tons/yr) | Projected Actual Emissions (ton/yr) | Difference (A-B) [5] (tons/yr) | Correction [7] (ton/yr) | Project Increase [8] (tons/yr) |
|---|---|---|---|---|---|---|---|---|---|---|
| | FIN | EPN | | B | | A | | | | |
| 13 | P-GB | F-GB | N/A | 0 | 0 | 1 | N/A | 1 | N/A | 1 |
| 14 | P-VOC | F-TK-VOC | N/A | 0 | 0 | 7 | N/A | 7 | N/A | 7 |
| 15 | 44EF2 | F-S-202 | N/A | 0 | 0 | 14 | N/A | 14 | N/A | 14 |
| 16 | 08FB142 | FB142 | N/A | N/A | N/A | 33 | N/A | 33 | N/A | 33 |
| 17 | 08FB147 | FB147 | N/A | | | | | | | |
| 18 | 08FB137 | FB137 | N/A | | | | | | | |
| 19 | 40FB4010 | FB4010 | N/A | | | | | | | |
| 20 | 40FB4011 | FB4011 | N/A | | | | | | | |
| 21 | MSSFUGS-DC | MSSFUGS-DC | N/A | 0 | 0 | 230 | N/A | 230 | N/A | 230 |
| 22 | | | | | | | | | | |
| 23 | | | | | | | | | | |
| 24 | | | | | | | | | | |
| | | | | | | | PAGE SUBTOTAL: [9] | | | 286 |
| | | | | | | | | Total | | 359991 |

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

## Table 1(a) Emission Point Summary

| | | | | | |
|---|---|---|---|---|---|
| **Date:** | **December 2012; Revised March 2014** | **Permit No.:** | **N/A** | **Regulated Entity No.:** | **RN100235266** |
| **Area Name:** | **Corpus Christi West Refinery** | | | **Customer Reference No.:** | **CN603741463** |

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

| **AIR CONTAMINANT DATA** | | | | |
|---|---|---|---|---|
| **1. Emission Point** | | | **2. Component or Air Contaminant Name** | **3. Air Contaminant Emission Rate** |
| **EPN (A)** | **FIN (B)** | **NAME (C)** | | **TPY (B)** |
| SATGASHTR | SATGASHTR | Sat Gas No. 3 Hot Oil Heater | Carbon Dioxide (CO2) | 236004.1 |
| | | | Methane (CH4) | 4.3 |
| | | | Nitrous Oxide (N2O) | 0.43 |
| | | | Carbon Dioxide Equivalent (CO2e) | 236242.2 |
| JJ-4 | 39BA3901 | CCR Hot Oil Heater | Carbon Dioxide (CO2) | 62890.1 |
| | | | Methane (CH4) | 3.58 |
| | | | Nitrous Oxide (N2O) | 0.72 |
| | | | Carbon Dioxide Equivalent (CO2e) | 63193.0 |

EPN = Emission Point Number
FIN = Facility Identification Number

TCEQ-10153 (Revised 0408)
This form is for use by sources subject to air quality
permit requirements and may be revised periodically. [APDG 5178v4]

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## Greenhouse Gas Emission Rate Calculations

**INPUT DATA**

| | |
|---|---|
| Combustion Unit Description: | 39BA3901 CCR Hot Oil Heater |
| Facility Identification Number (FIN): | 39BA3901 |
| Emission Point Number (EPN): | JJ-4 |

**COMBUSTION UNIT DATA**

| | | |
|---|---|---|
| Fuel Gas Firing Capacity, HHV: | 123.6 | MMBtu/hr, HHV |
| Operating Hours | 8760 | hrs/yr |

**EMISSION FACTORS**

| Pollutant | Emission Factor (kg/MMBtu) * | Emission Factor (lb/MMBtu) * | Global Warming Potentials ** |
|---|---|---|---|
| Carbon Dioxide ($CO_2$) | N/A | 116.17 | 1 |
| Methane ($CH_4$) | 0.003 | 0.0066 | 25 |
| Nitrous Oxide ($N_2O$) | 0.0006 | 0.00132 | 298 |

* The heater fires refinery fuel gas. The CO2 emission factor is derived from Equation C-5 in 40 C.F.R. Part 98, Subpart C and actual fuel gas data for the CCR fuel gas system. The $CH_4$ and $N_2O$ factors are from 40 CFR 98, Table C-2 for petroleum.

** Global warming potentials are from Table A-1 in 40 CFR 98, Subpart A.

**EMISSION RATES**

| Pollutant | GHG Annual Emissions (tons/yr) | $CO_2e$ Annual Emissions (tons/yr) |
|---|---|---|
| Carbon Dioxide ($CO_2$) | 62890 | 62890 |
| Methane ($CH_4$) | 3.58 | 89.51 |
| Nitrous Oxide ($N_2O$) | 0.72 | 213.40 |
| Total | 62894 | 63193 |

Emission rates are calculated using equations C-5 and C-8b and converting from metric tons/yr.

**Equation C-5 from 40 CFR 98, Subpart C**

$$CO_2 = \frac{44}{12} * Fuel * CC * \frac{MW}{MVC} * 0.001 \qquad \text{(Eq. C-5)}$$

$CO_2$ = Annual $CO_2$ mass emissions from combustion of the specific gaseous fuel (metric tons).
Fuel = Annual volume of the gaseous fuel combusted (scf). The volume of fuel combusted must be measured directly, using fuel flow meters calibrated according to §98.3(i). Fuel billing meters may be used for this purpose.
CC = Annual average carbon content of the gaseous fuel (kg C per kg of fuel). The annual average carbon content shall be determined using the same procedures as specified for HHV in paragraph (a)(2)(ii) of this section.
MW = Annual average molecular weight of the gaseous fuel (kg/kg-mole). The annual average molecular weight shall be determined using the same procedures as specified for HHV in paragraph (a)(2)(ii) of this section.
MVC = Molar volume conversion factor at standard conditions, as defined in §98.6. Use 849.5 scf per kg mole if you select 68 °F as standard temperature and 836.6 scf per kg mole if you select 60 °F as standard temperature.
44/12 = Ratio of molecular weights, $CO_2$ to carbon.
0.001 = Conversion factor from kg to metric tons.

**Equation C-8b from 40 CFR 98, Subpart C**
$CH_4$ or $N_2O$ (metric tons/yr) = 0.001 x Gas x EF
where
Gas = Annual natural gas usage (MMBtu)
EF = Fuel specific default $CH_4$ or $N_2O$ emission factor for natural gas from Table C-2 (kg/MMBtu)

1 metric ton = 1.1023 short tons

## Greenhouse Gas Emission Rate Calculations

**INPUT DATA**

| | |
|---|---|
| Combustion Unit Description: | 37BA2 DHT Stripper Reboiler (Potential to Emit) |
| Facility Identification Number (FIN): | 37BA2 |
| Emission Point Number (EPN): | KK-3 |

**COMBUSTION UNIT DATA**

| | | |
|---|---|---|
| Fuel Gas Firing Capacity, HHV: | 70.9 | MMBtu/hr, HHV |
| Operating Hours | 8760 | hrs/yr |

**EMISSION FACTORS**

| Pollutant | Emission Factor (kg/MMBtu) * | Emission Factor (lb/MMBtu) | Global Warming Potentials ** |
|---|---|---|---|
| Carbon Dioxide ($CO_2$) | N/A | 120.05 | 1 |
| Methane ($CH_4$) | 0.003 | 0.0066 | 25 |
| Nitrous Oxide ($N_2O$) | 0.0006 | 0.00132 | 298 |

* The heater fires refinery fuel gas. The CO2 emission factor is derived from Equation C-5 in 40 C.F.R. Part 98, Subpart C and actual fuel gas data for the Mid Plant fuel gas system. The $CH_4$ and $N_2O$ factors are from 40 CFR 98, Table C-2 for petroleum.

** Global warming potentials are from Table A-1 in 40 CFR 98, Subpart A.

**EMISSION RATES**

| Pollutant | GHG Annual Emissions (tons/yr) | $CO_2e$ Annual Emissions (tons/yr) |
|---|---|---|
| Carbon Dioxide ($CO_2$) | 37280 | 37280 |
| Methane ($CH_4$) | 2.05 | 51.35 |
| Nitrous Oxide ($N_2O$) | 0.41 | 122.41 |
| Total | 37282 | 37454 |

Emission rates are calculated using equations C-5 and C-8b and converting from metric tons/yr.

**Equation C-5 from 40 CFR 98, Subpart C**

$$CO_2 = \frac{44}{12} * Fuel * CC * \frac{MW}{MVC} * 0.001 \qquad \text{(Eq. C-5)}$$

$CO_2$ = Annual $CO_2$ mass emissions from combustion of the specific gaseous fuel (metric tons).
Fuel = Annual volume of the gaseous fuel combusted (scf). The volume of fuel combusted must be measured directly, using fuel flow meters calibrated according to §98.3(i). Fuel billing meters may be used for this purpose.
CC = Annual average carbon content of the gaseous fuel (kg C per kg of fuel). The annual average carbon content shall be determined using the same procedures as specified for HHV in paragraph (a)(2)(ii) of this section.
MW = Annual average molecular weight of the gaseous fuel (kg/kg-mole). The annual average molecular weight shall be determined using the same procedures as specified for HHV in paragraph (a)(2)(ii) of this section.
MVC = Molar volume conversion factor at standard conditions, as defined in §98.6. Use 849.5 scf per kg mole if you select 68 °F as standard temperature and 836.6 scf per kg mole if you select 60 °F as standard temperature.
44/12 = Ratio of molecular weights, $CO_2$ to carbon.
0.001 = Conversion factor from kg to metric tons.

**Equation C-8b from 40 CFR 98, Subpart C**
$CH_4$ or $N_2O$ (metric tons/yr) = 0.001 x Gas x EF
where
Gas = Annual natural gas usage (MMBtu)
EF = Fuel specific default $CH_4$ or $N_2O$ emission factor for natural gas from Table C-2 (kg/MMBtu)

1 metric ton = 1.1023 short tons

## Greenhouse Gas Emission Rate Calculations

**INPUT DATA**

| | |
|---|---|
| Combustion Unit Description: | Boilers (Incremental Increase) |
| Facility Identification Number (FIN): | Various Boilers |
| Emission Point Number (EPN): | Various Boilers |

**COMBUSTION UNIT DATA**

| | | |
|---|---|---|
| Fuel Gas Firing Capacity, HHV: | 96 | MMBtu/hr, HHV |
| Operating Hours | 8760 | hrs/yr |

**EMISSION FACTORS**

| Pollutant | Emission Factor (kg/MMBtu) * | Emission Factor (lb/MMBtu) * | Global Warming Potentials ** |
|---|---|---|---|
| Carbon Dioxide ($CO_2$) | N/A | 120.05 | 1 |
| Methane ($CH_4$) | 0.003 | 0.0066 | 25 |
| Nitrous Oxide ($N_2O$) | 0.0006 | 0.00132 | 298 |

* The boilers fire refinery fuel gas. The CO2 emission factor is derived from Equation C-5 in 40 C.F.R. Part 98, Subpart C and actual fuel gas data for the Mid Plant fuel gas system. The $CH_4$ and $N_2O$ factors are from 40 CFR 98, Table C-2 for petroleum.

** Global warming potentials are from Table A-1 in 40 CFR 98, Subpart A.

**EMISSION RATES**

| Pollutant | GHG Annual Emissions (tons/yr) | $CO_2e$ Annual Emissions (tons/yr) |
|---|---|---|
| Carbon Dioxide ($CO_2$) | 50478 | 50478 |
| Methane ($CH_4$) | 2.78 | 69.52 |
| Nitrous Oxide ($N_2O$) | 0.56 | 165.74 |
| Total | 50481 | 50713 |

Emission rates are calculated using equations C-5 and C-8b and converting from metric tons/yr.

**Equation C-5 from 40 CFR 98, Subpart C**

$$CO_2 = \frac{44}{12} * Fuel * CC * \frac{MW}{MVC} * 0.001 \qquad \text{(Eq. C-5)}$$

$CO_2$ = Annual $CO_2$ mass emissions from combustion of the specific gaseous fuel (metric tons).
Fuel = Annual volume of the gaseous fuel combusted (scf). The volume of fuel combusted must be measured directly, using fuel flow meters calibrated according to §98.3(i). Fuel billing meters may be used for this purpose.
CC = Annual average carbon content of the gaseous fuel (kg C per kg of fuel). The annual average carbon content shall be determined using the same procedures as specified for HHV in paragraph (a)(2)(ii) of this section.
MW = Annual average molecular weight of the gaseous fuel (kg/kg-mole). The annual average molecular weight shall be determined using the same procedures as specified for HHV in paragraph (a)(2)(ii) of this section.
MVC = Molar volume conversion factor at standard conditions, as defined in §98.6. Use 849.5 scf per kg mole if you select 68 °F as standard temperature and 836.6 scf per kg mole if you select 60 °F as standard temperature.
44/12 = Ratio of molecular weights, $CO_2$ to carbon.
0.001 = Conversion factor from kg to metric tons.

**Equation C-8b from 40 CFR 98, Subpart C**
$CH_4$ or $N_2O$ (metric tons/yr) = 0.001 x Gas x EF
where
Gas = Annual natural gas usage (MMBtu)
EF = Fuel specific default $CH_4$ or $N_2O$ emission factor for natural gas from Table C-2 (kg/MMBtu)

1 metric ton = 1.1023 short tons

## Start-up/Shutdown/Maintenance Fugitive Emissions
## Emissions Summary
## EPN MSSFUGS-DC

| Event | $CO_2$ Emission Rates (ton/yr) | $CH_4$ Emission Rates (ton/yr) | $N_2O$ Emission Rates (ton/yr) | GHG Emission Rates (ton/yr) | $CO_2e$ Emission Rates (ton/yr) |
|---|---|---|---|---|---|
| Equipment Openings | | 0.05 | | 0.05 | 1.25 |
| Controlling MSS Activities | 228 | 0.010 | 0.0018 | 228 | 229 |
| **Total** | **228** | **0.06** | **0.0018** | **228** | **230** |

# Start-up/Shutdown/Maintenance Fugitive Emissions
# GHG Emissions from Controlling MSS Activities
# EPN MSSFUGS-DC

## COMBUSTION UNIT DATA

| | | |
|---|---|---|
| Fuel Gas Firing Capacity, HHV: | 10 | MMBtu/hr, HHV |
| Operating Hours | 278 | hrs/yr |

## EMISSION FACTORS

| Pollutant | Emission Factor (kg/MMBtu) * | Emission Factor (lb/MMBtu) | Global Warming Potentials ** |
|---|---|---|---|
| Carbon Dioxide ($CO_2$) | 74.49 | 164.22 | 1 |
| Methane ($CH_4$) | 0.003 | 0.0066 | 25 |
| Nitrous Oxide ($N_2O$) | 0.0006 | 0.00132 | 298 |

* The control device combusts propane and other petroleum vapors. The $CO_2$ emission factor is from 40 CFR 98, Table C-1 for crude oil, which is the highest factor for all types of vapors combusted. The CH4 and N2O factors are from 40 CFR 98, Table C-2 for petroleum.

** Global warming potentials are from Table A-1 in 40 CFR 98, Subpart A.

## EMISSION RATES

| Pollutant | GHG Annual Emissions (tons/yr) | $CO_2$-e Annual Emissions (tons/yr) |
|---|---|---|
| Carbon Dioxide ($CO_2$) | 228 | 228 |
| Methane ($CH_4$) | 0.010 | 0.250 |
| Nitrous Oxide ($N_2O$) | 0.0018 | 0.536 |
| Total | 228 | 229 |

Emission rates are calculated using equations C-1b and C-8b and converting from metric tons/yr.

**Equation C-1b from 40 CFR 98, Subpart C**
$CO_2$ (metric tons/yr) = 0.001 x Gas x EF
where
Gas = Annual propane/petroleum vapor usage (MMBtu)
EF = Fuel specific default $CO_2$ emission factor for crude oil from Table C-1 (kg/MMBtu)

**Equation C-8b from 40 CFR 98, Subpart C**
$CH_4$ or $N_2O$ (metric tons/yr) = 0.001 x Gas x EF
where
Gas = Annual propane/petroleum vapor usage (MMBtu)
EF = Fuel specific default $CH_4$ or $N_2O$ emission factor for petroleum from Table C-2 (kg/MMBtu)

1 metric ton = 1.1023 short tons

Step 5: Select the BACT.

In the fifth step, the most effective control option, based on the impacts quantified in Step 4, is proposed as BACT for the emission unit under review. For both the Sat Gas No. 3 and CCR Hot Oil Heaters, FHR proposes use of the top and only remaining BACT option—the implementation of energy efficient design and operating practices. The implementation of a state-of-the-art, energy efficient design results in a heater design efficiency of 92% for the new Sat Gas No. 3 Hot Oil Heater and 91% for the CCR Hot Oil Heater, and energy efficient operating practices will minimize GHG emissions over time.

The proposed form of the limitations is summarized in the following table:

| Category | Demonstration |
|---|---|
| Limitations | Greenhouse gas emissions limited to the following tons $CO_2e$ per year on a 365-day rolling total:<br><br>Sat Gas No. 3 Hot Oil Heater 236,242 tons $CO_2e$/365-days<br>CCR Hot Oil Heater 63,193 tons $CO_2e$/365-days<br><br>An effective means to demonstrate heater operating efficiency is to rely upon the stack exit temperature as a surrogate. Based upon the design of these heaters, maintaining the stack exit temperature below 350 degrees F on a 365-day rolling average basis, excluding periods of heater start-up, shutdown, and low firing rates (<60% of maximum design capacity), over the life of the equipment is indicative of a properly operated heater designed for 92% (Sat Gas No. 3 Hot Oil Heater)/91% (CCR Hot Oil Heater) efficiency. |
| | Limit excess $O_2$ in the Sat Gas No. 3 Hot Oil Heater and the CCR Hot Oil Heater exhaust to 4% or less on a 365-day rolling average basis, excluding periods of heater start-up, shutdown, and low firing rates (<60% of maximum design capacity). See Notes 1 and 4. |
| | Additional work practice standard: In accordance with 40 C.F.R. part 63, subpart DDDDD, conduct annual tune-up (which may include burner inspection and cleaning, flame inspection and optimization, air-to-fuel ratio, and CO optimization as required by subpart DDDDD). |
| Monitoring Requirements | Maintain compliance with 40 C.F.R. Part 98, Subpart C including flow monitoring of fuel usage and fuel gas analysis. |
| | Maintain a flue gas temperature monitor to continuously record flue gas exit temperature on each hot oil heater while the heaters are in service. |
| | Continuously monitor each heater's stack exit temperature. Stack exit temperatures recorded during periods of monitoring |