

**San Joaquin Valley
Unified Air Pollution Control District**

Best Performance Standard (BPS) x.x.xx

Date: 7/01/2010

| | |
|--|--|
| Class | Components at Light Crude Oil and Natural Gas Production, Natural Gas Processing Facilities, Petroleum Refineries, Gas Liquids Processing Facilities, and Chemical Plants |
| Category | <ul style="list-style-type: none"> - Components Subject to Rules 4409 & 4455 Requirements - Components Not Subject to Rules 4409 & 4455 Requirements |
| Best Performance Standard | <ul style="list-style-type: none"> - Components Subject to Rules 4409 and 4455 Requirements: Minimize fugitive GHG emissions by applying leak standards and I&M requirements to components subject to Rules 4409 and 4405 requirements - Components Not Subject to Rules 4409 and 4455 Requirements: Minimize fugitive GHG emissions by applying leak standards and I&M requirements to components not subject to Rules 4409 and 4455 requirements |
| Percentage Achieved GHG Emission Reduction Relative to Baseline Emissions | <p>Components Subject to Rules 4409 & 4455 Requirements:</p> <ul style="list-style-type: none"> - Light Crude Oil & Natural Gas Production: 60% - Natural Gas Processing: 82% - Refineries: 86% - Gas Liquid Processing: 89% <p>Components Not Subject to Rules 4409 & 4455 Requirements:</p> <ul style="list-style-type: none"> - Components: 91% |

| | |
|-------------------------------------|------------------------|
| District Project Number | C-1100392 |
| Evaluating Engineer | Dolores Gough, P.E. |
| Lead Engineer | Leonard Scandura, P.E. |
| Initial Public Notice Date | April 20, 2010 |
| Final Public Notice Date | May 14, 2010 |
| Determination Effective Date | July 01, 2010 |

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I. Best Performance Standard (BPS) Determination Introduction

A. Purpose

To assist permit applicants, project proponents, and interested parties in assessing and reducing the impacts of project specific greenhouse gas emissions (GHG) on global climate change from stationary source projects, the San Joaquin Valley Air Pollution Control District (District) has adopted the policy: *District Policy – Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency*. This policy applies to projects for which the District has discretionary approval authority over the project and the District serves as the lead agency for CEQA purposes. Nonetheless, land use agencies can refer to it as guidance for projects that include stationary sources of emissions. The policy relies on the use of performance based standards, otherwise known as Best Performance Standards (BPS) to assess significance of project specific greenhouse gas emissions on global climate change during the environmental review process, as required by CEQA. Use of BPS is a method of streamlining the CEQA process of determining significance and is not a required emission reduction measure. Projects implementing BPS would be determined to have a less than cumulatively significant impact. Otherwise, demonstration of a 29 percent reduction in GHG emissions, from business-as-usual, is required to determine that a project would have a less than cumulatively significant impact.

B. Definitions

Best Performance Standard for Stationary Source Projects is – a specific Class and Category, the most effective, District approved, Achieved-In-Practice means of reducing or limiting GHG emissions from a GHG emissions source, that is also economically feasible per the definition of achieved-in-practice. BPS includes equipment type, equipment design, and operational and maintenance practices for the identified service, operation, or emissions unit class and category.

Business-as-Usual is - the emissions for a type of equipment or operation within an identified class and category projected for the year 2020, assuming no change in GHG emissions per unit of activity as established for the baseline period, 2002-2004. To relate BAU to an emissions generating activity, the District proposes to establish emission factors per unit of activity, for each class and category, using the 2002-2004 baseline period as the reference.

Category is - a District approved subdivision within a “class” as identified by unique operational or technical aspects.

Class is - the broadest District approved division of stationary GHG sources based on fundamental type of equipment or industrial classification of the source operation.

C. Determining Project Significance Using BPS

Use of BPS is a method of determining significance of project specific GHG emission impacts using established specifications. BPS is not a required mitigation of project related impacts. Use of BPS would streamline the significance determination process by pre-quantifying the emission reductions that would be achieved by a specific GHG emission reduction measure and pre-approving the use of such a measure to reduce project-related GHG emissions.

GHG emissions can be directly emitted from stationary sources of air pollution requiring operating permits from the District, or they may be emitted indirectly, as a result of increased electrical power usage, for instance. For traditional stationary source projects, BPS includes equipment type, equipment design, and operational and maintenance practices for the identified service, operation, or emissions unit class and category.

II. Summary of BPS Determination Phases

The District has established *Components at Light Crude Oil and Natural Gas Production and Natural Gas Processing Facilities and at Petroleum Refineries, Gas Liquids Processing Facilities and Chemical Plants* as a separate class and category which requires implementation of a Best Performance Standard (BPS) pursuant to the District's Climate Change Action Plan (CCAP). The District's determination of the BPS for this class and category has been made using the phased BPS development process established in the District's Final Staff Report, *Addressing Greenhouse Gas Emissions under the California Environmental Quality Act*. A summary of the specific implementation of the phased BPS development process for this specific determination is as follows:

| Table 1 BPS Development Process Phases for Components at Light Crude Oil and Natural Gas Production and Natural Gas Processing Facilities and at Petroleum Refineries, Gas Liquids Processing Facilities and Chemical Plants | | | |
|---|-------------------------|-------------|--|
| Phase | Description | Date | Comments |
| 1 | Public Notice of Intent | 02/09/10 | The District's intent notices are attached as Appendix 1. |
| 2 | BPS Development | 04/15/10 | See evaluation document. |
| 3 | Public Participation | 04/20/10 | A Draft BPS evaluation was provided for public comment. The District's notification is attached as Appendix 3. |
| 4 | Public Comments | 05/14/10 | No comments were received during the public review period. |
| 5 | Finalization | 7/01/10 | The BPS established in this evaluation document is effective on the date of finalization. |

III. Class and Category

This class and category applies to components containing or contacting gaseous streams at light crude oil production facilities, natural gas production facilities, natural gas processing facilities, petroleum refineries, gas liquids processing facilities, and chemical plants. These components include, but not limited to, any valve, fitting, threaded connection, pump, compressor, pressure relief device, flange, process drain, sealing mechanism, hatch, sight glass, meter or seal fluid system in VOC service. VOC emissions from this source are currently limited by the application of leak standards and an inspection and maintenance (I&M) program required by District rules. The application of the rule requirements are expected to also limit GHG emissions, primarily methane.

Current rules exempt certain components such as pressure relief devices, pumps, and compressors equipped with a closed vent systems, components buried below ground, those exclusively handling gas/vapor or liquid streams with a VOC content of 10% by weight or less, and components exclusively handling commercial natural gas.

The application of the I&M requirements specified in District rules for components subject to the rules and those components not subject to those rules will result in a reduction of fugitive GHG emissions. Therefore, the BPS considered for this class and category will apply for all components associated with light crude oil and natural gas production/processing, refineries, liquids processing and chemical plants, even those that are not subject to a particular rule requirement.

IV. Public Notice of Intent

Prior to developing the development of BPS for this class and category, the District published a Notice of Intent. Public notification of the District's intent to develop BPS for this class and category was sent on February 9, 2010 to individuals registered with the CCAP list server. Follow-up notices to provide clarification on information needed for BPS development and extension of initial commenting period were sent to individuals in the CCAP list. The District's notifications are attached as Appendix 1.

Comments received during the initial public outreach are presented in Appendix 2. These comments have been used in the development of this BPS as presented below.

V. BPS Development

STEP 1. Establish Baseline Emissions Factor for Class and Category

The Baseline Emission Factor (BEF) is defined as the three-year average (2002-2004) of GHG emissions for a particular class and category of equipment in the San Joaquin Valley (SJV), expressed as annual greenhouse gas (GHG) emissions per unit of activity. The Baseline Emission Factor is calculated by first defining an operation which is representative of the average population of units of this type in the SJV during the Baseline Period and then determining the specific emissions per unit throughput for the representative unit.

A. Representative Baseline Operation

For the above equipment (components serving light crude oil or gases at light crude oil and gas production and natural gas processing facilities), the representative baseline operation are components that were subject to Rule 4403 during 2002-2004. District Rule 4403 expired on April 20, 2006 and Rule 4409 was adopted on April 20, 2005. The rules apply to components containing or contacting volatile organic compound (VOC) streams at light crude oil production facilities, natural gas production facilities and natural gas processing facilities. The components affected include, but not limited, to valves, threaded connections, pumps, compressors, pressure relief devices (PRDs), polished rod stuffing box, etc. District Rule 4403 has a leak definition of 10,000 ppmv for gas processing facilities and allows a repair period of 15 calendar days after a leak is discovered. PRSBs were not subject to District Rule 4403.

For refineries and gas liquids processing facilities, the baseline operations are based on previous Rule 4455 leak definition of 10,000 ppmv and leak repair period of 15 days that was in effect in 2002-2004.

B. Basis and Assumptions

- *GHG emissions are stated as "CO₂ equivalent" (CO₂e) which includes the global warming potential of methane and carbon dioxide emissions associated with gaseous fugitive emissions*
- *Only direct GHG emissions are produced from the equipment/operation*
- *Fugitive CH₄ and CO₂ emissions will be reduced similar to fugitive VOCs*
- *Fugitive gas consists of 85% VOC and 15% CH₄ (AP-42 Section 5.2); therefore, CO₂ is assumed negligible for calculation purposes*
- *Number of components provided to the District (Rule 4409 Analysis report)*
- *For components not subject to District rule requirements, fugitive GHG emissions from various oil & gas production and processing equipment or operation are taken from American Petroleum Institute (API) 2009 Compendium*

C. Unit of Activity

To relate Business-as-Usual to an emissions generating activity, it is necessary to establish an emission factor per unit of activity, for the established class and category, using the 2002-2004 baseline period as the reference.

For Components subject to District Rules 4409 and 4455: *GHG emissions are expressed in metric tons CO₂e per component.*

For Components not subject to District Rules 4409 and 4455: *available information on GHG emissions are expressed in varying units (metric tons CO₂e per bbl crude oil or per scf gas, or per mile pipeline or per facility).*

D. Calculations

The GHG baseline emissions, as shown below, were estimated from the VOC baseline emissions inventories provided and used by the District during analysis of the applicable rules.

1) Light Crude Oil & Natural Gas Production & Processing

| | VOC (Mton/day) | CH ₄ (Mton/day) ^A | CO ₂ e (Mton/day) ^B | CO ₂ e (Mton/day/comp) ^C |
|---|-------------------|--|--|---|
| Light Crude Oil & Natural Gas Production | | | | |
| Calculated Baseline Emissions | 20.2675 | 3.58 | 75.11 | 7.64E-05 |
| Gas Processing | | | | |
| Calculated Baseline Emissions | 6.007 | 1.06 | 22.26 | 5.23E-05 |
| Total Emissions | | | | |
| Calculated Baseline Emissions | 26.2745 | 4.64 | 97.37 | 1.29E-04 |

2) Petroleum Refineries & Gas Liquid Processing

| | VOC (Mton/day) | CH ₄ (Mton/day) ^A | CO ₂ e (Mton/day) ^B | CO ₂ e (Mton/day/comp) ^C |
|-------------------------------|-------------------|--|--|---|
| Refineries | | | | |
| Calculated Baseline Emissions | 0.789 | 0.14 | 2.92 | 1.01E-04 |
| Liquid Processing | | | | |
| Calculated Baseline Emissions | 2.674 | 0.47 | 9.91 | 6.67E-05 |
| Total Emissions | | | | |
| Calculated Baseline Emissions | 3.463 | 0.61 | 12.83 | 1.68E-04 |

^A CH₄ (Mton/day) = [VOC (Mton/day)/0.85] * 0.15

^B CO₂e (Mton/day) = CH₄ (Mton/day) * 21 (conversion factor to CO₂e)

^C CO₂e (Mton/day/comp) = CO₂e (Mton/day)/total number of components

3) Fugitive GHG emissions not controlled by District rule requirements

As stated in the assumption, baseline emissions to be used are available GHG emissions compiled by API for the various oil & gas production and processing equipment)

| Equipment/Operation | CO ₂ e (Mton/bbl) | CO ₂ e (Mton/10 ⁶ scf) | CO ₂ e (Mton/stn/yr) | CO ₂ e (Mton/mile/yr) | Gas Content Basis |
|---|---------------------------------|---|------------------------------------|-------------------------------------|--|
| Onshore Oil Production | 4.93E-03 | | | | 78.8 % vol CH ₄ |
| Onshore Gas Production | | 5.46E-01 | | | 78.8 % vol CH ₄ |
| Gas Processing Plants | | 6.14E-01 | | | 86.8 % vol CH ₄ |
| Gas Storage Stations | | | 1.42E+04 | | 93.4 % vol CH ₄ |
| Gas Transmission Pipelines | | | | 7.57E+01 | 93.4% vol CH ₄ / 2%CO ₂ |
| Gas Distribution Pipelines | | | | 3.45E+01 | 93.4% vol CH ₄ / 2%CO ₂ |
| Refining-Fuel Gas System (110 K to 199K bbl/day) | 2.96E-05 | | | | not available |
| Refining-Natural Gas System (110 K to 199K bbl/day) | 2.12E-05 | | | | not available |
| Total | 4.98E-03 | 1.16E+00 | 1.42E+04 | 1.10E+02 | |

STEP 2. List Technologically Feasible GHG Emission Control Measures

Currently, facilities are required by District Rules 4409 and 4455 to perform annual inspection and maintenance (I&M) to control VOC emissions. The annual I&M will also control fugitive methane emissions. Therefore, annual I&M is achieved in practice for the control of GHGs as well.

Fugitive emissions from components not subject to District rule requirements can also be controlled by implementation of an I&M program using the same frequencies specified in District Rules 4409 and 4455.

For the specific equipment or operation being proposed, all technologically feasible GHG emissions reduction measures are listed, including equipment selection, design elements and best management practices, that do not result in an increase in criteria pollutant emissions compared to the proposed equipment or operation. The following findings or considerations are applicable to this class and category:

a) Technologically Feasible - Increased Inspection & Maintenance Frequency for Components Subject to District Rules 4409 and 4455 Requirements

Current District Rules 4409 and 4455 requirements is annual inspection and maintenance. Increasing I&M frequency should decrease direct GHG emissions but has not been achieved in practice. This control measure would not result in an increase in emissions of criteria pollutants.

b) Technologically Feasible - Increased Frequency of Inspection & Maintenance for Components not Subject to District Rules 4409 and 4455 Requirements

Applying leak standards and I&M requirements to components not subject to District Rules 4409 and 4455 requirements is expected to decrease GHG emissions. This control measure would not result in an increase in emissions of criteria pollutants.

| Table 2 Technologically Feasible GHG Control Measures for Light Crude Oil and Natural Gas Production and Natural Gas Processing Facilities and at Petroleum Refineries, Gas Liquids Processing Facilities and Chemical Plants | |
|--|--|
| Control Measure | Qualifications |
| Increasing I&M frequency for components subject to District Rules 4409 and 4455 requirements | Increasing I&M frequency for components subject to District Rules 4409 and 4455 requirements will reduce fugitive VOCs and GHG emissions |
| Applying leak standards and I&M requirements for components not subject to District Rules 4409 and 4455 requirements | Applying leak standards and I&M requirements for components not subject to District Rules 4409 and 4455 requirements will reduce fugitive VOCs and GHG emissions from those components |

STEP 3. Identify all Achieved-in-Practice GHG Emission Control Measures

For all technologically feasible GHG emission reduction measures, all GHG reduction measures determined to be Achieved-in-Practice are identified. Achieved-in-Practice is defined as any equipment, technology, practice or operation available in the United States that has been installed and operated or used at a commercial or stationary source site for a reasonable period of time sufficient to demonstrate that the equipment, the technology, the practice or the operation is reliable when operated in a manner that is typical for the process. In determining whether equipment, technology, practice or operation is Achieved-in-Practice, the District will consider the extent to which grants, incentives or other financial subsidies influence the economic feasibility of its use.

The following findings or considerations are applicable to this class and category:

- *Current District Rule 4409 defines leak for components, except PRDs, in liquid service as 1,000 to 10,000 ppmv and 2,000 to 10,000 ppmv for the same components in gas/vapor service. The PRD leak is defined as 200 to 10,000 ppmv for the liquid service and 400 to 10,000 ppmv for the gas/vapor service. Component leak repair period has been changed from zero to 7 days depending on the severity of the leak.*

- *Current District Rule 4455 defines leak for components, except for PRD, pumps & compressors, in liquid service as 200 to 10,000 ppmv and 400 to 10,000 ppmv for the same components in gas/vapor service.*
- *Compliance with District Rules 4409 and 4455 will limit fugitive VOCs as well as fugitive GHG emissions.*
- *Leak thresholds have also been reduced depending on component type.*
- *Application of the I&M to all components subject to District Rules 4409 and 4455, and to those components that are not subject to I&M requirements will limit VOCs as well as GHG emissions.*

Based on a review of available technology, the following is determined to be the Achieved-in-Practice GHG emission reduction measures for this class and category:

| Table 3 Achieved-in-Practice GHG Control Measures for Light Crude Oil and Natural Gas Production and Natural Gas Processing Facilities and at Petroleum Refineries, Gas Liquids Processing Facilities and Chemical Plants | |
|--|---|
| Control Measure | Achieved-Quantifications |
| Components subject to District Rules 4409 and 4455 requirements: Minimize fugitive GHG emissions by applying leak standards and I&M requirements | Current rules specify a leak definition of a minimum of 200 ppmv to 1,000 ppmv for the various components. Repair periods are also specified depending on the severity of the leak and leak thresholds have been reduced. These I&M measures also reduce GHG emissions. |
| Components not subject to District Rules 4409 and 4455 requirements: Minimize fugitive GHG emissions by applying leak standards and I&M requirements | Current rules exempt certain components associated with this class and category but an I&M program is applicable to these components to control fugitive GHG emissions. |

STEP 4. Quantify the Potential GHG Emission and Percent Reduction for Each Identified Achieved-in-Practice GHG Emission Control Measure

A. Basis and Assumptions

- *All direct GHG emissions are reduced along with VOC emissions due to I & M requirements*
- *Fugitive methane emissions reduction rate will be similar to that of fugitive VOCs*
- *VOC reduction was taken from the Rule 4409 and 4405 Analysis 2006 report based on current rule leak definition and change in repair periods*
- *Fugitive gas consists of 85% VOC and 15% CH₄ (AP-42, Section 5.2); therefore, CO₂ is assumed negligible for calculation purposes.*
- *Number of components provided to the District (same number used as in the baseline calculations)*
- *For fugitive GHG emissions from components subject to District rules, the % GHG emissions reduction compared to the baseline, is based on VOC reductions due to implementation of I&M and change in leak definitions as determined by the District in the rule analysis report.*
- *For fugitive GHG emissions from components not subject to District rules, it is assumed that implementation of an I&M program should reduce the GHG emissions by the same percentage, as compared to the baseline, calculated for components subject to the rules. Furthermore, implementing an I&M program applicable to these components not previously controlled, will result in additional VOC and GHG emission reductions, beyond the GHG emission reductions identified for equipment already subject to the rules (see calculations in Step 4, B, in the table below) .*

B. Calculation of Potential GHG Emissions Reduction

Fugitive GHG emissions reduction were estimated from the VOC emissions reductions which were based on the change in leak definition, repair periods and leak thresholds in the current District Rules 4409 and 4455. These VOC reductions were taken from the District rule analysis report.

1) Light Crude Oil & Natural Gas Production

| | VOC (Mton/day) | VOC Reduction (Mton/day) | CO ₂ e (Mton/day) ^A | CO ₂ e Reduction (Mton/day) ^B | % CO ₂ e Reduction ^C |
|--|-------------------|--------------------------------|--|---|---|
| Light Crude Oil & Natural Gas Production | | | | | |
| Baseline Emissions | 20.2675 | | 75.11 | | |
| Change in Leak definition & threshold | | 11.83 | | 43.85 | |
| Change repair period | | 0.36 | | 1.34 | |
| Sub-total | | 12.19 | | 45.19 | |
| CO ₂ e baseline emissions per component (Mton/day/comp) | | | 7.64E-05 | | |
| CO ₂ e reduction per component (Mton/day/comp) | | | | 4.59E-05 | 60 % |

2) Gas Processing

| | VOC (Mton/day) | VOC Reduction (Mton/day) | CO ₂ e (Mton/day) ^A | CO ₂ e Reduction (Mton/day) ^B | % CO ₂ e Reduction ^C |
|---|-------------------|--------------------------------|--|---|---|
| Gas Processing | | | | | |
| Baseline Emissions | 6.007 | | 22.26 | | |
| Change in Leak definition & threshold | | 4.79 | | 17.76 | |
| Change repair period | | 0.14 | | 0.53 | |
| Sub-total | | 4.93 | | 18.29 | |
| CO ₂ e baseline emissions per component (Mton/day/comp) ^D | | | 5.23E-05 | | 82 % |
| CO ₂ e reduction per component (Mton/day/comp) ^D | | | | 4.30E-05 | |

3) Petroleum Refineries & Gas Liquid Processing

| | VOC (Mton/day) | VOC Reduction (Mton/day) | CO ₂ e (Mton/day) ^A | CO ₂ e Reduction (Mton/day) ^B | % CO ₂ e Reduction ^C |
|---|-------------------|--------------------------------|--|---|---|
| Refineries | | | | | |
| Baseline emissions | 0.789 | | 2.92 | | |
| Change in Leak definition & threshold | | 0.68 | | 2.50 | |
| Change in repair period | | 0.00 | | 0.00 | |
| Control PRD Releases | | 0.00 | | 0.00 | |
| Sub-total | | 0.68 | | 2.51 | |
| CO ₂ e baseline emissions per component (Mton/day/comp) ^D | | | 1.01E-04 | | 86 % |
| CO ₂ e reduction per component (Mton/day/comp) ^D | | | | 8.74E-05 | |
| Gas Liquid Processing | | | | | |
| Baseline emissions | 2.674 | | 9.91 | | |
| Change in Leak definition & threshold | | 2.33 | | 8.65 | |
| Change in repair period | | 0.04 | | 0.15 | |
| Control PRD Releases | | 0.00 | | 0.02 | |
| Sub-total | | 2.37 | | 8.82 | |
| CO ₂ e baseline emissions per component (Mton/day/comp) ^D | | | 6.67E-05 | | |
| CO ₂ e reduction per component (Mton/day/comp) ^D | | | | 5.94E-05 | 89 % |

^A CH₄ (ton/day) = [VOC (ton/day)/0.85] * 0.15
^B CO₂e (ton/day) = CH₄ (ton/day) *21 (conversion factor to CO₂e)
^C % CO₂e reduction = CO₂e (ton/day/comp)/baseline CO₂e * 100%
^D CO₂e per component = CO₂e (M ton/day)/number of components

4) Fugitive GHG emissions Not Subject to Rules 4409 and 4455 Requirements

Since these components were not previously subject to rule requirements, VOC and GHG emissions reduction achieved by implementing an I&M program can be quantified using a control efficiency of 58%. This efficiency (shown below) is the average of the control efficiencies achieved for quarterly I&M with 10,000 ppm leak definition at Synthetic Organic Chemical Industry (SOCI) facilities and refineries for components in gas and leak service (Tables 5-2 and 5-3, EPA's Protocol for Equipment Leak Emission Estimates).

Average control efficiency for SOCM I and Refinery facilities are:

- valves (gas) – 69%;
- valves (light liquid) – 61%;
- pumps (light liquid) – 45%;
- average = 58.3%

In addition to the 58% reduction that is discussed above, an additional reduction should be achieved as a result of implementing the current I&M standards. Therefore, the current or reduced GHG emissions (CO₂e) for components not subject to the rules can be calculated using the following equation and the results are summarized in the table below:

$$\text{CO}_2\text{e (current)} = \text{CO}_2\text{e (baseline from Step 1 above)} \times (1 - 0.58) \times (1 - \%E)$$

Where E = efficiency for components subject to the rule (from 60 to 89% depending on equipment or operation, see Tables 1-3 of Step 4)

Best Performance Standard
 Class: Components at Light Crude Oil and Natural Gas Production, Natural Gas Processing Facilities,
 Petroleum Refineries, Gas Liquids Processing Facilities, and Chemical Plants Light
 Category: Components Subject or not to District Rules 4409 & 4455 Requirements
 Date: 7/1/2010

| Equipment/Operation | CO ₂ e (Mton/bbl) | CO ₂ e (Mton/10 ⁶ scf) | CO ₂ e (Mton/stn/yr) | CO ₂ e (Mton/mile/yr) | Gas Content Basis |
|---|---------------------------------|---|------------------------------------|-------------------------------------|--|
| Onshore Oil Production | 8.28E-04 | | | | 78.8 % vol CH ₄ |
| Onshore Gas Production | | 9.17E-02 | | | 78.8 % vol CH ₄ |
| Gas Processing Plants | | 3.61E-02 | | | 86.8 % vol CH ₄ |
| Gas Storage Stations | | | 6.56E+02 | | 93.4 % vol CH ₄ |
| Gas Transmission Pipelines | | | | 5.72E+00 | 93.4% vol CH ₄ / 2%CO ₂ |
| Gas Distribution Pipelines | | | | 2.61E+00 | 93.4% vol CH ₄ / 2%CO ₂ |
| Refining-Fuel Gas System (110 K to 199K bbl/day) | 1.74E-06 | | | | not available |
| Refining-Natural Gas System (110 K to 199K bbl/day) | 1.25E-06 | | | | not available |
| CO₂e Total Baseline Emissions (from Step 1) | 4.98E-03 | 1.16E+00 | 1.42E+04 | 1.10+02 | |
| CO₂e Total Current Emissions (calculated) | 8.31E-04 | 1.28E-01 | 6.56E+00 | 8.33+00 | |
| % Reduction (control efficiency) | 83-94% | 83-94% | 95% | 92% | Ave 91% |

STEP 5. Rank all Achieved-in-Practice GHG emission reduction measures by order of % GHG emissions reduction

Based on the calculations presented in Section II.4 above, the Achieved-in-Practice GHG emission reduction measures are ranked in the table below:

| Table 4 Ranking of Achieved-in-Practice GHG Emission Control Measures | | | |
|--|---|--|--|
| Rank | Control Measure | Potential GHG Emission per Unit of Activity (Mton CO₂e/total components) | Potential GHG Emission Reduction as a Percentage of the Baseline Emission Factor (G_p) |
| 1 | Components subject to District Rules 4409 and 4455 requirements: Minimize fugitive GHG emissions by applying leak standards and I&M requirements | See table above | - Light Crude Oil & Natural Gas Production: 60% - Natural Gas Processing: 82% - Refineries: 86% - Gas Liquid Processing : 89% |
| | Components not subject to District Rules 4409 and 4455 requirements: Minimize fugitive GHG emissions by applying leak standards and I&M requirements | See table above | - Components: 91% |

STEP 6. Establish the Best Performance Standard (BPS) for this Class and Category

For Stationary Source Projects for which the District must issue permits, Best Performance Standard is – “For a specific Class and Category, the most effective, District approved, Achieved-In-Practice means of reducing or limiting GHG emissions from a GHG emissions source, that is also economically feasible per the definition of achieved-in-practice. BPS includes equipment type, equipment design, and operational and maintenance practices for the identified service, operation, or emissions unit class and category”.

Based on the definition above and the ranking of evaluated technologies, Best Performance Standard (BPS) for this class and category is determined as:

Best Performance Standard for Light Crude Oil and Natural Gas Production/ Processing Facilities and at Petroleum Refineries, Gas Liquids Processing Facilities and Chemical Plants:

- ***Components Subject to Rules 4409 and 4455 Requirements: Minimize fugitive GHG emissions by applying leak standards and I&M requirements to components subject to District Rules 4409 and 4405 requirements***
- ***Components Not Subject to Rules 4409 and 4455 Requirements: Minimize fugitive GHG emissions by applying leak standards and I&M requirements to components not subject to District Rules 4409 and 4455 requirements***

STEP 7. Eliminate All Other Achieved-in-Practice Options from Consideration as Best Performance Standard

The following Achieved-in-Practice GHG control measures, identified in Section II.4 and ranked in Table 3 of Section II.5 are specifically eliminated from consideration as Best Performance Standard since they have GHG control efficiencies which are less than that of the selected Best Performance Standard as stated in Section II.6:

No other Achieved-in-Practice options were identified.

VI. Public Participation

A Draft BPS evaluation was provided for public comment. Public notification was sent on April 20, 2010 to individuals registered with the CCAP list server. The District's notification is attached as Appendix 3.

VII. Appendices

- Appendix 1: Public Notice of Intent: Notices
- Appendix 2: Comments Received During the Public Notice of Intent
- Appendix 3: Public Participation: Notice

Appendix 1

Public Notice of Intent: Notices



San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT



Notice Of Development Of Best Performance Standards

NOTICE IS HEREBY GIVEN that the San Joaquin Valley Air Pollution Control District solicits public comment on development of Best Performance Standards for the following Stationary Source class and category of greenhouse gas emissions:

Oil and Gas Extraction, Storage, Transportation and Refining Operations

The District is soliciting public input on the following topics for the subject Class and Category of greenhouse gas emission source:

- Recommendations regarding the scope of the proposed Class and Category (Stationary GHG sources group based on fundamental type of equipment or industrial classification of the source operation),
- Recommendations regarding processes or operational activities the District should consider when establishing Baseline Emissions for the subject Class and Category,
- Recommendations regarding processes or operational activities the District should consider when converting Baseline Emissions into emissions per unit of activity, and
- Recommendations regarding technologies to be evaluated by the District, when establishing Best Performance Standards for the subject Class and Category.

Information regarding development of Best Performance Standard for the subject Class and Category of greenhouse gas emission source can be obtained from the District's website at http://www.valleyair.org/Programs/CCAP/CCAP_idx.htm.

Written comments regarding the subject Best Performance Standard should be addressed to Dolores Gough by email, Dolores.Gough@valleyair.org, or by mail at SJVUAPCD, 34946 Flyover Court, Bakersfield, CA 93308 and must be received by **February 23, 2010**. For additional information, please contact Dolores Gough by e-mail or by phone at (661) 392-5609.

Information regarding the District's Climate Action Plan and how to address GHG emissions impacts under CEQA, can be obtained from the District's website at http://www.valleyair.org/Programs/CCAP/CCAP_idx.htm.

From: Mark Montelongo
Sent: Tuesday, February 09, 2010 9:04 AM
To:
'Oil_and_Gas_Extraction_Storage_Transportation_and_Refining_Operations_BPS@lists.valleyair.org'
Subject: Notice of Development

The San Joaquin Valley Air Pollution Control District is soliciting public input on the development of Best Performance Standards. The Notice of Development for Oil and Gas Extraction, Storage, Transportation and Refining Operators is available [here](#).

Written comments regarding the subject Best Performance Standard should be addressed to Dolores Gough by email, Dolores.Gough@valleyair.org, or by mail at SJVUAPCD, 34946 Flyover Court, Bakersfield, CA 93308 and must be received by **February 23, 2010**. For additional information, please contact Dolores Gough by e-mail or by phone at (661) 392-5609.

From: Mark Montelongo
Sent: Friday, February 19, 2010 8:23 AM
To: 'Oil_and_Gas_Extraction_Storage_Transportation_and_Refining_Operations_BPS@lists.valleyair.org'
Cc: Arnaud Marjollet
Subject: Commenting Deadline - Oil & Gas Extraction, Storage, Transportation & Refining BPS

As a reminder, the San Joaquin Valley Air Pollution Control District is soliciting public input on the development of Best Performance Standards. The Notice of Development for Oil and Gas Extraction, Storage, Transportation and Refining Operators is available [here](#).

Written comments regarding the subject Best Performance Standard should be addressed to Dolores Gough by email, Dolores.Gough@valleyair.org, or by mail at SJVUAPCD, 34946 Flyover Court, Bakersfield, CA 93308 and must be received by **February 23, 2010**. For additional information, please contact Dolores Gough by e-mail or by phone at (661) 392-5609.

From: Mark Montelongo
Sent: Thursday, February 25, 2010 1:20 PM
To: 'Oil_and_Gas_Extraction_Storage_Transportation_and_Refining_Operations_BPS@lists.valleyair.org'
Cc: Arnaud Marjollet; Dan Barber
Subject: Extension of Commenting Period for Oil and Gas Extraction, Storage, Transportation and Refining Operations

The District is extending the initial commenting period regarding development of Best Performance Standards (BPS) for Oil and Gas Extraction, Storage, Transportation and Refining Operations. The information requested below will be used when establishing Best Performance Standards for this Class and Category:

- Types of equipment with fugitive emissions that were in operation during the baseline period (2002-2004)
- Aspects of operating the subject emissions source that are unique to your equipment
- Proposals for basis to quantify GHG emissions (lb/bbl oil, lb/process throughput, lb/equipment, etc)
- Vapor analysis quantifying CO₂, methane and non-methane components
- Technologies or operational activities currently in practice to which should be considered.
- Any other suggestions, comments, and or data

Written comments regarding the subject Best Performance Standard should be addressed to Dolores Gough by email, Dolores.Gough@valleyair.org, or by mail at SJVUAPCD, 34946 Flyover Court, Bakersfield, CA 93308 and must be received by **March 4, 2010**. For additional information, please contact Dolores Gough by e-mail or by phone at (661) 392-5609.

Appendix 2

Comments Received During the Public Notice of Intent

From: Joe Selgrath [mailto:selgrath@ix.netcom.com]
Sent: Monday, February 22, 2010 1:04 PM
To: 'Dolores Gough'
Subject: RE: BPS for Oil and Gas

Hi Dolores,

My comments follow:

-
- 1) Establishment of Best Performance Standards for the Oil and Gas sector is a daunting task. There are multiple types of equipment, facility design, and operational characteristics that make establishment of a "BPS" for the oil and gas sector difficult. We recommend that the District structure BPS following the existing categories and organization of the District's BACT guidelines.
 - 2) BPS is already in effect for new sources through the District's BACT guidelines. BACT standards achieve reductions in VOC from crude oil operations, and consequently, achieve reductions in methane through these same controls. BPS should be equivalent to BACT for that category and type of source.
 - 3) BPS needs to provide exemptions for small sources small sources of GHG emissions. EPA is proposing a threshold of 25,000 MT CO₂e, and a similar threshold should be part of any BPS determination.

Thanks

Joe Selgrath
EnviroTech Consultants, Inc.

From: Dennis_Champion@oxy.com [mailto:Dennis_Champion@oxy.com]
Sent: Monday, February 22, 2010 12:45 PM
To: Dolores Gough
Subject: RE: Greenhouse Gas_ Oil & Gas extraction_storage

Dolores:

This really is not much to work with. However...

1. In the Valley, fugitive monitoring is currently conducted for all sources > 30 API (cutoff for Rule 4409). Therefore, if this is mandated as a BPS, will current practices be included in the determination? If so, that will provide fugitive I&M for sources < 30 API. Also, Are these BPS for existing operations or for planned projects (i.e. - new steam flood). How are the BPS going to be implemented?
2. Except for small producers, you will not find a great deal of these tanks. Must be careful when making demands on the independents as the present exemptions are basically there in the rules for them (via Les Clark). Again, will operators get credit for what they are currently doing? Above and beyond?
3. I am not sure I know what you are talking about. Steam drive wells?
4. What are you going to do about a floating roof? Options?

Concerns:

1. BPS ultimately become regulations. This worries more than a small number of operators. Regulation through Policy is a disease.
2. Do operators receive credit for current activities under a BPS?
3. In other words, is BPS only for new projects? Can existing practices be utilized to supplement?

WCI is currently working on gas-actuated controllers. Are there other topics members can think of. Are you only looking at fugitives or combustion sources as well although not much to do here either). Where is gas vented? Most of these sources are already controlled.

PS - There was nothing really to comment on. We can sit down and develop something more substantive and distribute to any who have signed up. Then need to have meetings at specific times (telephone or otherwise) and set definitive schedules for deliverables. Need to integrate into and take credit for existing operations rather than creating more requirements.

Let me know what you think?

Dennis

From: Ludwick, John J. [mailto:jjl@bry.com]
Sent: Tuesday, February 23, 2010 3:09 PM
To: Dennis Roberts; Steven Roeder; James Harader; Dolores Gough
Cc: Boston, Robert E.
Subject: Comments on BPS

In my opinion the District can not receive adequate information to form BPS without first meeting with industry and their representatives to discuss what the baseline period equipment is. A blanket request for information will only create confusion and the submittal of information that can only be applied to a single company. Once the District understands the difference not only between industrial types, but the differences within the same industry, can the District begin receiving adequate information to form an achievable and economical BPS.

Thank you,

John Ludwick
Regulatory Compliance Specialist
Berry Petroleum Company
5201 Truxtun Avenue
Bakersfield, CA. 93309
Phone: (661) 616-3807
Cell: (661) 703-2920
Fax: (661) 616-3892



William Fall
Health, Environment, and
Safety Manager

San Joaquin Valley BU
Chevron North America
Exploration and Production
P.O. Box 1392
Bakersfield, CA 93302
Tel 661 654 7038
Fax 661 654 7606

23 February 2010

San Joaquin Valley Unified Air Pollution Control District
Mr. David Warner, Director, Permit Services
Attn: Dolores Gough
2700 M St. Suite 275
Bakersfield, CA 93301.

Re: Response to "Notice of Development of Best Performance Standards"

Via email: Delores.Gough@valleyair.org

Dear Mr. Warner:

Chevron USA, Inc. (Chevron) appreciates the opportunity to provide the San Joaquin Valley Unified Air Pollution Control District (District) with assistance in developing Best Performance Standards (BPS) for "Oil & Gas Extraction, Storage, Transportation and Refining Operations" as a part of the District's Climate Change Action Plan. The BPS development potentially will benefit California's ability to effect reductions in carbon dioxide emissions without unnecessary harm to the state's economy.

Chevron requests additional time to evaluate the details of your information request and prepare our response. Chevron can submit these comments to the District by 23 March 2010.

Thank you for this opportunity to participate in this important process. Please contact Spencer Hammond (Spence@chevron.com), telephone: (661) 302-4516, should you have questions.

Regards,

Sincerely,

A handwritten signature in black ink, appearing to read "W. R. Fall", written over a horizontal line.

for:

William R. Fall
Chevron Health, Environmental and Safety Manager

From: Dennis_Champion@oxy.com [mailto:Dennis_Champion@oxy.com]
Sent: Monday, March 01, 2010 5:23 PM
To: Dolores Gough
Cc: Arnaud Marjollet; dan.barber@valleyair.org
Subject: FW: Extension of Commenting Period for Oil and Gas Extraction, Storage, Transportation and Refining Operations

See my comments below.

Also, to the extent possible, the baseline should be moved back to the 1990 timeframe to match the timeframe of the AB32 baseline. Looking to another baseline could be counter-productive.

From: oil_and_gas_extraction_storage_transportation_and_refining_operations_bps@lists.valleyair.org [mailto:oil_and_gas_extraction_storage_transportation_and_refining_operations_bps@lists.valleyair.org]
Sent: Thursday, February 25, 2010 1:20 PM
To: Champion, Dennis
Cc: Arnaud Marjollet; Dan Barber
Subject: [Oil_and_Gas_Extraction_Storage_Transportation_and_Refining_Operations_BPS] Extension of Commenting Period for Oil and Gas Extraction, Storage, Transportation and Refining Operations

The District is extending the initial commenting period regarding development of Best Performance Standards (BPS) for Oil and Gas Extraction, Storage, Transportation and Refining Operations. The information requested below will be used when establishing Best Performance Standards for this Class and Category:

- Types of equipment with fugitive emissions that were in operation during the baseline period (2002-2004)
Tanks, engines, wells, loading racks, depurators, gasoline storage and dispensing, gas plants, vessels at various facilities, pipelines
- Aspects of operating the subject emissions source that are unique to your equipment
Light oil with associated gas requires substantially more oversight.
- Proposals for basis to quantify GHG emissions (lb/bbl oil, lb/process throughput, lb/equipment, etc)
The predominant emissions point from operations is fugitive emissions. The emissions are based on components. Therefore, emissions should be based on a component type similar to the CAPCOA/EPA guidance. Utilizing a basis such as lbm/bbl is misleading as the emissions are not affected by throughput. They are only affected by the gas quality.

- Vapor analysis quantifying CO₂, methane and non-methane components
The gas quality associated with a surface site is typically similar to other surface sites in the immediate area. However, the extent of difference between sites is generally marginal. Vapor analysis can be provided.
- Technologies or operational activities currently in practice to which should be considered.
A Fugitive Inspection and Maintenance program is best method to ensure leaks from fugitive components are identified and repaired. Also, training to stress sight, sound, and smell to the operators as well as the entire work force. The more eyes, ears, and noses the better. Finally, a good maintenance program is necessary to ensure program integrity.
- Any other suggestions, comments, and or data
As stated above, the best management practice is training to increase the amount of knowledgeable eyes, ears, and noses in the field.

Written comments regarding the subject Best Performance Standard should be addressed to Dolores Gough by email, Dolores.Gough@valleyair.org, or by mail at SJVUAPCD, 34946 Flyover Court, Bakersfield, CA 93308 and must be received by **March 4, 2010**. For additional information, please contact Dolores Gough by e-mail or by phone at (661) 392-5609.

From: Jerry Frost [mailto:jfrost@kernoil.com]
Sent: Thursday, March 04, 2010 5:02 PM
To: Dolores Gough
Subject: ::::BPS Refinery Storage and Fugitives – Comments

Dolores

Here are a few thoughts with regards to storage and fugitive sources at a refinery that may contribute to GHG emissions and some of the existing controls that should be considered as Best Performance Standards (BPS) mitigation measures.

Organic Liquid Storage Tanks: Rule 4623 requirements should be considered BPS for organic liquid storage tanks. Controls are based on tank size, throughput and vapor pressure. Current controls offer up to 99% control efficiency. In refinery operations, the methane content is 60% or less of the tank vapor phase. The following examples demonstrate that tank methane emissions are a very small and insignificant contributor of GHG emissions.

1. A 10,000 barrel tank on vapor recovery storing gasoline with a vapor pressure 7 RVP and assuming 100 turnovers per year only contributes 990 lbs of methane emissions per year.
2. A 10,000 barrel tank uncontrolled tank storing a low vapor pressure < 0.5 RVP and assuming 100 turnovers per year only contributes 3.8 lbs of methane emissions per year.

Existing Rule 4623 controls already reduce GHG emissions to the greatest extent possible. Kern recommends Organic Liquid Storage Rule 4623 be adopted as BPS for GHG emissions.

Fugitive Emissions: Rule 4455 is clearly the most stringent fugitive emissions rule in the country and already places significant control on GHG emissions. Quarterly inspections, one hour minimum repairs, and repairs to leak free condition between 2 to 7 days and requirements to replace chronic leakers with BACT components, have significantly reduced VOC and associated GHG emissions.

Existing Rule 4455 controls already reduce GHG emissions to the greatest extent possible. Kern recommends Fugitive Rule 4455 be adopted as BPS for GHG emissions.

Jerry Frost
Senior Environmental Regulatory Advisor
Kern Oil & Refining Company

Initial WSPA Response to SJVAPCD Information Request

General Policy Considerations

- The fugitive emissions (VOC) I&M program assures equivalent significant GHG emission reductions compared to standard of practice nationwide.
- Very small equipment should continue to be considered de minimis as is currently done with criteria pollutant policy. Specifically, some tanks including drain tanks and very small tanks are not currently controlled, are very small sources of emissions, and should retain an exclusionary element for certain conditions.
- Equipment in this category needs to be subdivided adequately to account for site and application variables.
- TEOR wells and tank VCS should allow combustion of waste gas, where possible, in available combustion equipment (consistent with criteria pollutant policy).
- Flaring is required in some situations, at least for emergency and backup purposes (consistent with criteria pollutant policy).
- Existing SJVAPCD fugitive emissions I&M reporting provides all this guidance the District needs to establish a GHG baseline.
- California ARB is also in the process of developing the same fugitive emission inventory information.

Technical Information to be Provided

For consistency and accuracy, it is recommended that SJVAPCD refer to established fugitive emissions programs with regard to this BPS category:

- It is suggested that the District utilize the information in the SJVAPCD fugitive emission I&M program.
- It is suggested that the District utilize the soon-to-be-completed California ARB AB 32 GHG-related equipment inventory.

OIL & GAS EXTRACTION, STORAGE, AND PRODUCTION BEST PERFORMANCE STANDARDS (BPS)

CCAP Staff Report

- Methane emissions shall be minimized by applying VOC leak standards to components handling methane – Using District Rules 4409 and 4455.
- Rule 4409 applies to component containing or contacting VOC streams at crude oil production and natural gas production and processing facilities.
- Rule 4455 applies to petroleum refineries, chemical plants and gas liquids processing facilities.
- Components – valves, pipes, flanges, pumps, etc.
- Leak standards range from 200 ppmv to 10,000 ppmv, depending on the type of component.
- Not applicable to components at oil/gas production facilities with a VOC content of 10% by weight or less or to natural gas processing facilities with a VOC content of less than 1% by weight.
- Not applicable to components handling commercial grade natural gas.

GHG Emission Reductions

- Reports indicate that Rules 4409 and 4455 result in a 60.2% reduction of fugitive VOC emissions from the baseline period of 2002-2004 (when there were no leak standards, inspections and monitoring requirements).

Mitigation Measures

- All equipment will be operated in accordance with manufacturer specifications and approved design specifications.
- Operations shall apply leak standards, inspections and monitoring plans according to Rules 4409 and 4455.

BPS Notice of Development

The information requested below will be used when establishing Best Performance Standards for this Class and Category:

- Recommendations regarding the scope of the proposed Class and Category (Stationary GHG sources group based on fundamental type of equipment or industrial classification of the source operation).
- Recommendations regarding processes or operational activities the District should consider when establishing Baseline Emissions for the subject Class and Category.
- Recommendations regarding processes or operational activities the District should consider when converting Baseline Emissions into emissions per unit of activity.
- Recommendations regarding technologies to be evaluated by the District, when establishing Best Performance Standards for the subject Class and Category.

-
- Types of equipment with fugitive emissions that were in operation during the baseline period (2002-2004).
 - Aspects of operating the subject emission source unique to your equipment.
 - Proposals for basis to quantify GHG emissions (lb/bbl oil, lb/process throughput lb/equipment, etc).
 - Vapor analysis quantifying CO₂, methane and non-methane components.
 - Technologies or operational activities currently in practice to which should be considered.
 - Any other suggestions, comments, and or data.

Appendix 3

Public Participation: Notice

From: Mark Montelongo
Sent: Tuesday, April 20, 2010 4:11 PM
To:
'Oil_and_Gas_Extraction_Storage_Transportation_and_Refining_Operations_BPS@lists.valleyair.org'
Subject: SJVAPCD-Proposed Draft Best Performance Standards (BPS)

The San Joaquin Valley Air Pollution Control District is soliciting public comment on the development of Best Performance Standards (BPS). This email is to advise you the Draft Proposed BPS documents for Oil & Gas Extraction, Storage, Transportation and Refining Operations are now available for your review.

- Draft Proposed BPS - Production/Processing/Refineries is available [here](#).
- Draft Proposed BPS - TEOR Wells is available [here](#).

Written comments should be addressed to Dolores Gough by email, Dolores.Gough@valleyair.org, or by mail at SJVAPCD, 34946 Flyover Court, Bakersfield, CA 93308 and must be received by May 11, 2010. For additional information, please contact Dolores Gough by e-mail or by phone at (661) 392-5609.