San Joaquin Valley
Unified Air Pollution Control District

Best Performance Standard (BPS) x.x.xx

Date: August 21, 2012

Class	**Ovens**
Category	**Beverage Container Cap Drying/Curing Ovens**
Best Performance Standard	**Beverage container cap drying/curing ovens with thermal resistant insulation using computer controlled variable speed premium efficient electric motors for the oven exhaust fans and premium efficiency electric motors for all conveyor drive motors.**
Percentage Achieved GHG Emission Reduction Relative to Baseline Emissions	**13.6%**

District Project Number	N-1113688
Evaluating Engineer	Kai Chan
Lead Engineer	Arnaud Marjollet
Public Notice: Start Date	August 23, 2012
Public Notice: End Date	September 21, 2012
Determination Effective Date	TBD

TABLE OF CONTENTS

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 polic*y: 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 for a specific Class and Category is 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 Process

The District has established beverage container cap drying/curing ovens 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 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 Beverage Container Cap Drying/Curing Ovens

Phase	Description	Date	Description
1	Public Notice of Intent	12/8/2011	The District's intent notice is attached as Appendix 1
2	BPS Development	8/21/2012	See evaluation document
3	Public Participation Notice	8/23/2012	A Draft BPS evaluation was provided for public comment. The District's notification is attached as Appendix 3

III. Class and Category

Ovens, as defined in District Rule 4309 (Dryers, Dehydrators, and Ovens), are chambers in which material is dried or cured in direct contact with the products of combustion. Since beverage container cap drying/curing ovens use a series of chambers to dry and cure coatings and inks in direct contact with the products of combustion, they are included in the ovens class.

This BPS is specifically requested by a container cap manufacturing facility for their conveyorized container cap coating and printing operation which is served by three drying/curing ovens. Beverage container cap drying/curing ovens utilize a series of chambers with natural gas fired burners or electric heating elements to heat the chamber to a specific temperature. The first heated chamber is used to remove any grease remaining from the manufacturing of the caps, the second heated chamber is used to cure the applied base coating, and finally the third heated chamber is used to cure the applied inks to produce the desired graphics on the caps. Since this BPS is being specifically developed for beverage container cap drying/curing ovens it is classified in a separate category.

IV. Public Notice of Intent

Prior to developing the 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 December 8, 2011 to individuals registered with the CCAP list server. The District's notification is attached as Appendix 1.

Any comments received during the initial public outreach will be included in Appendix 2 of the final BPS evaluation.

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 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 beverage container cap drying/curing ovens**,** the representative baseline operation has been determined to be a 66 kWh electric drying/curing oven with non-heat insulated chambers using "standard efficiency" electric motors for the exhaust fans and conveyors. This determination is based on conversations with representatives of beverage container cap manufacturers, equipment manufacturers, and review of the units operated during the baseline period within the District.

B. Basis and Assumptions

- All direct GHG emissions are produced by the combustion of natural gas in this unit.
- The GHG emission factor for natural gas combustion is 117 lb-CO_2e/MMBtu per CCAR(1) document.
- Indirect emissions for the representative unit are produced due to operation of associated electric heating element in the oven, exhaust fan blower motors, and conveyor motors with a total energy usage of 66 kW.
- The cap processing rate for a representative unit is 7,800 caps per hour based on a unit operating within the District during the baseline period.
- Indirect emissions from electric power consumption are calculated based on the current PG&E electric power generation factor of 0.524 lb-CO_2e per kWh.

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.

The resulting emissions factor is the combination of
GHG emission reductions achieved through technology, and
GHG emission reductions achieved through changes in activity efficiencies.

For beverage container cap drying/curing ovens, the GHG emission factor will be based on the quantity of GHG emitted per 1,000 caps processed through the ovens.

[1] California Climate Change Action Registry (CCAR), Version 3.1, January 2009 (Appendix C, Tables C.7 and C.8).

D. Calculations

This determination is based on a review of the permitted units which were operating in the District during the baseline period, which only included the use of an electric oven and associated electric motors. Therefore, the Baseline Emission Factor (BEF) only includes the indirect GHG emissions from the production of electricity as calculated below:

It takes 66 kW to produce 7,800 caps in an hour, therefore:

Indirect GHG Emissions $= 66 \text{ kW} \times 1 \text{ hr}/7.8\times1000 \text{ caps} \times 0.524 \text{ lb-}CO_2\text{e/kWh}$
$= 4.4 \text{ lb-}CO_2\text{e}/1{,}000 \text{ caps}$

BEF = 4.4 lb-CO_2e/1,000 caps

STEP 2. List Technologically Feasible GHG Emission Control Measures

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:

<u>Insulation on the Outer Surfaces of the Oven:</u>

To reduce heat loss through the outer surfaces of the oven, high thermal resistance insulation may be used on the oven. By adding insulation to the outer surface of the oven, the convection heat losses from within the heated air of the oven is reduced and the required drying or curing air temperature will be retained for a longer time. Therefore, less fuel will be combusted by the oven to maintain the required air temperature within the oven.

<u>Computer Controlled Variable Speed Electric Motors for Oven Exhaust Fans:</u>

Constant computer control of an oven exhaust fan by use of a variable speed electric motor will provide energy savings when compared to a fan which is operated at a fixed speed and controlled manually by operators using dampers to throttle the discharge flow. For this type of operation the drying/curing ovens are maintained at a constant operating temperature, which will be effected by the convection heat losses due to the volume of container caps processed. A computer controlled variable speed fan can respond more quickly and efficiently to temperature variations then a manually controlled fixed speed fan. Consequently less fuel will be used by the oven burners to maintain the required interior oven temperature. By having the ability to instantly control the speed of the exhaust fan, energy usage by the associated electric motor is also reduced and optimized.

Use of Premium Efficiency Motors:

An electric motor efficiency standard is published by the National Electrical Manufacturers Association (NEMA) which is identified as the "NEMA Premium Efficiency Electric Motors Program". For small motors rated 1.0 to 5.0 horsepower, the NEMA premium efficiency motor provides a gain of approximately 2 to 3.5 percentage points in motor efficiency when compared to a standard efficiency motor. The NEMA specification covers motors up to 500 horsepower and motors meeting this specification are in common use and are available from most major electric motor manufacturers.

Conclusion:

Based on a review of available technology and with consideration of input from industry, manufacturers, and other members of the public, the following is determined to be the technologically feasible GHG emission reduction measures for this class and category:

Table 2
Technologically Feasible GHG Control Measures for Beverage Container Cap Drying/Curing Ovens

GHG Control Measures	Qualifications
Insulation of the Drying/Curing Ovens	Thermal resistant insulation reduces direct GHG emissions by reducing the amount of fuel required to achieve and maintain drying or curing.
Computer Controlled Variable Speed Electric Motors for Oven Exhaust Fans	Computer controlled variable speed electric motors reduce both direct and indirect GHG emissions by reducing the amount of burner fuel usage and electric motor power usage.
Electric motors driving oven exhaust fans shall have an efficiency meeting the standards of NEMA for "premium efficiency" motors.	Premium efficiency exhaust fan motors reduce indirect GHG emissions by reducing electrical power demand.

All of the GHG emissions control measures identified above are equipped with control equipment for criteria pollutants which meets current regulatory requirements. None of the identified GHG emission control measures would result in an increase in emissions of criteria pollutants.

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:

- Based on a conversation with a beverage container cap equipment manufacturer the use of insulation in drying/curing ovens was not commonly used during the baseline period. However, recently manufactured units are being installed with insulation to reduce fuel costs as requested by their customers. Therefore, this technology is considered to be Achieved-In-Practice.
- Based on a conversation with a beverage container cap equipment manufacturer, computer controlled variable speed electric motors is an equipment option which customers are recently requesting to reduce operating cost. Therefore, this technology is considered to be Achieved-In-Practice.
- The EPA's premium efficiency electric motor standard became effective in 2010, it is expected that such motors will become the industry standard. Therefore, this technology is considered to be Achieved-in-Practice at this time.

Based on a review of available technology and with consideration of input from industry, manufacturers and other members of the public, the following is determined to be the Achieved-In-Practice GHG emission reduction measure for this class and category:

Table 3 Achieved-in-Practice GHG Control Measures for Beverage Container Cap Drying/Curing Ovens	
GHG Control Measures	**Qualifications**
Beverage container cap drying/curing ovens with thermal resistant insulation using computer controlled variable speed premium efficient electric motors for the oven exhaust fans and premium efficiency electric motors for all conveyor drive motors.	A survey of permitted units in the District indicated that there is one beverage container cap drying/curing oven recently installed within the District using these GHG control measures. However, according to the manufacturer, there are a few more units in operation throughout the country.

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

For each Achieved-in-Practice GHG emission reduction measure identified:

a. Quantify the potential GHG emissions per unit of activity (G_a)
b. Express the potential GHG emission reduction as a percent (G_p) of Baseline GHG emissions factor per unit of activity (BEF)

- Beverage container cap drying/curing ovens with thermal resistant insulation using computer controlled variable speed premium efficient electric motors for the oven exhaust fans and premium efficiency electric motors for all conveyor drive motors.

A. Basis and Assumptions:

The representative unit used in this analysis is a unit which is currently operating at G3 Enterprises – Closure Division under District Permit to Operate N-2028-10-1. This unit currently utilizes the GHG emission control measures identified above to reduce their potential GHG emissions. The following operating parameters are based on this unit:

- All direct GHG emissions are produced by the combustion of natural gas in this unit.
- Total fuel consumption for this unit is 0.5 MMBtu/hr.
- The GHG emission factor for natural gas combustion is 117 lb-CO_2e/MMBtu per CCAR document.
- Indirect emissions for this unit are produced due to operation of associated exhaust fan blower motors and conveyor motors with a total energy usage of 61 kW.

- The cap processing rate for this unit is 24,000 caps per hour based on this unit currently operating within the District.
- Indirect emissions from electric power consumption are calculated based on the current PG&E electric power generation factor of 0.524 lb-CO_2e per kWh.

B. Calculation of Potential GHG Emissions per Unit of Activity (G_a):

Specific electricity consumption for the exhaust fan blower motors and conveyor motors are:

Electric Consumption = 61 kW × 1 hr/24.0×1,000 caps
= 2.54 kWh/1,000 caps

Indirect GHG Emissions are:

Indirect GHG Emissions = 2.54 kWh/1,000 caps × 0.524 lb-CO_2e/kWh
= 1.3 lb-CO_2e/1,000 caps

Specific fuel consumption for the natural gas fired drying ovens are:

Fuel Consumption = 0.5 MMBtu/hr × 1 hr/24.0×1,000 caps
= 0.021 MMBtu/1,000 caps

Direct GHG Emissions are:

Direct GHG Emissions = 0.021 MMBtu/1,000 caps × 117 lb-CO_2e/MMBtu
= 2.5 lb-CO_2e/1,000 caps

GHG Emissions per Unit of Activity is then calculates as:

G_a = 1.3 lb-CO_2e/1,000 caps + 2.5 lb-CO_2e/1,000 caps
= **3.8 lb-CO_2e/1,000 caps**

C. Calculation of Potential GHG Emission Reduction as a Percentage of the Baseline Emission Factor (G_p):

G_p = (BEF – Ga) ÷ BEF
= (4.4 lb-CO_2e/1,000 caps – 3.8 lb-CO_2e/1,000 caps) ÷ 4.4 lb-CO_2e/1,000 caps
= **13.6%**

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	**GHG Control Measures**	**Potential GHG Emission per Unit of Activity (G_a) (lb CO_2e/1,000 caps)**	**Potential GHG Emission Reduction as a Percentage of the Baseline Emission Factor (G_p)**
1	Beverage container cap drying/curing ovens with thermal resistant insulation using computer controlled variable speed premium efficient electric motors for the oven exhaust fans and premium efficiency electric motors for all conveyor drive motors.	3.8	13.6%

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:

<u>Best Performance Standard for Beverage Container Cap Drying/Curing Ovens</u>

Beverage container cap drying/curing ovens with thermal resistant insulation using computer controlled variable speed premium efficient electric motors for the oven exhaust fans and premium efficiency electric motors for all conveyor drive motors.

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

The following Achieved-in-Practice GHG control measures identified and ranked in the table above are 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 Step 6 of this evaluation:

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 December 8, 2011 to individuals registered with the CCAP list server. The District's notification is attached as Appendix 3.

VIII. Appendices

Appendix 1: Public Notice of Intent: Notice
Appendix 2: Comments Received During the Public Notice of Intent and Responses to Comments
Appendix 3: Notice of Public Participation

Appendix 1
Public Notice of Intent

Notice of Development Of
Best Performance Standards

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

Beverage Container Cap Drying/Curing Ovens

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

- Recommendations regarding process 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 control measures applicable to direct sources of greenhouse gas emissions.
- Recommendations regarding technologies to be evaluated by the District when establishing control measures applicable to indirect sources of greenhouse gas emissions.

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 Kai Chan by email, kai.chan@valleyair.org, or by mail at SJVAPCD, 4800 Enterprise Way, Modesto, CA 95356. All comments must be received by **December 30, 2011**. For additional information, please contact Kai Chan by e-mail or by phone at (209) 557-6451.

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.

Appendix 2

Comments Received During the Public Notice of Intent and Responses to Comments

No Comments Were Received During the Public Notice of Intent Period

Appendix 3

Public Participation Notice

The San Joaquin Valley Air Pollution Control District is soliciting public comments on the development of Best Performance Standards (BPS). This email is to advise you the Draft Proposed BPS documents for Beverage Container Cap Drying/Curing Ovens are now available for your review.

- Draft BPS – Beverage Container Cap Drying/Curing Ovens is available here.
- Draft Evaluation – Beverage Container Cap Drying/Curing Ovens is available here.

Written comments should be addressed to Kai Chan by email Kai.Chan@valleyair.org or by mail at SJVAPCD, 4800 Enterprise Way, Modesto, CA 95356 and must be received by September 21, 2012. For additional information, please contact Kai Chan by e-mail or by phone at (209) 557-6451.