San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 8.3.10*

Emissions Unit: Cooling Tower – Induced Draft, Evaporative Cooling

Industry Type: Electric Power Generation Facility

Equipment Rating: All

Last Update: March 24, 2022

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
PM_{10}	High Efficiency Cellular-Type Drift Eliminator (0.0005% drift rate)		

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Proactive Best Available Control Technology Analysis

District BACT Guideline 8.3.10

Cooling Tower – Induced Draft, Evaporative Cooling

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I. Introduction

The objective of this project is to proactively update the Best Available Control Technology (BACT) guideline 8.3.10, which is applicable for induced draft evaporative cooling towers used in the electric power generation industry. This guideline was last updated on June 19, 2000.

The current update will incorporate any applicable and more stringent emission control standards that have been achieved in practice or determined to be technologically feasible since the last update. Any corrections and/or changes needed to ensure consistency with the District's BACT policy and other District practices will also be made.

The discussions in this update will be limited to the following topics:

- Source of emissions
- Current BACT requirements
- Top-Down BACT Analysis for each pollutant
- Recommendation

II. Source of emissions

Cooling towers are heat exchangers that are used to dissipate large heat loads to the atmosphere. Particulate matter (PM) emissions are the result of the total dissolved solids (TDS) in the circulating water which are carried out with the water that is entrained in the air being discharged from the tower.

Cooling towers used in the petroleum/gas industry (such as refineries and chemical plants) may emit VOC emissions due to leaks within the cooling water/petroleum heat exchangers as well as the circulating water being used to cool down the hydrocarbon process stream. However, cooling towers used in the electric power production industry do not emit VOCs as the cooling water extracts heat from the steam or condensed steam in a heat exchanger and no petroleum compounds are used.

III. Top-Down BACT Analysis

BACT analysis for PM_{10} Emissions

As explained earlier, PM_{10} is emitted from TDS carried out with the water that is entrained in the air being discharged from the tower.

Step 1 - Identify All Possible Control Technologies

The following BACT clearinghouse references were reviewed to determine whether any induced draft, evaporative cooling towers have been required to employ PM_{10} controls:

- EPA RACT/BACT/LAER clearinghouse
- CARB BACT clearinghouse
- South Coast AQMD (SCAQMD) BACT clearinghouse
- Bay Area AQMD (BAAQMD) BACT clearinghouse
- Sacramento Metro AQMD (SMAQMD) BACT clearinghouse
- San Diego APCD (SDAPCD) BACT clearinghouse
- San Joaquin Valley APCD (SJVAPCD) BACT clearinghouse

The EPA RACT/BACT/LAER clearinghouse:

The EPA RACT/BACT/LAER clearinghouse does not include any BACT requirements for induced draft, evaporative cooling towers.

CARB BACT clearinghouse:

The CARB clearinghouse does not include any BACT requirements for induced draft, evaporative cooling towers.

South Coast AQMD (SCAQMD) BACT clearinghouse

The South Coast AQMD BACT clearinghouse does not include any BACT requirements for induced draft, evaporative cooling towers.

Bay Area AQMD (BAAQMD) BACT clearinghouse

The BAAQMD BACT clearinghouse does not include any BACT requirements for induced draft, evaporative cooling towers.

Sacramento Metro AQMD (SMAQMD) BACT clearinghouse

The SMAQMD clearinghouse does not include any BACT requirements for induced draft, evaporative cooling towers.

San Diego AQMD (SDAPCD) BACT clearinghouse

The SDAPCD clearinghouse does not include any BACT requirements for induced draft, evaporative cooling towers.

San Joaquin Valley APCD (SJVAPCD) BACT clearinghouse

The current requirements of SJVAPCD BACT Guideline 8.3.10 are summarized in the following table:

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
PM_{10}		Cellular Type Drift Eliminator	

2. Survey of Sources:

A review of the District's permit database (PAS) shows there are 19 electrical power generation facilities that utilize induced draft, evaporative cooling towers. The permit units and control equipment are summarized in the table below.

Facility Name	Permit Number	Control Equipment/Emission Limit
Kingsburg Cogen Facility	C-722-5-5	Cooling tower (0.005% drift rate)
Madera Power, LLC	C-799-4-4	Cooling tower
Covanta Mendota LP	C-825-11-5	Cooling tower with drift eliminator
Rio Bravo Fresno	C-1820-1-29	Cooling tower
	C-1820-8-4	Cooling tower
Algonquin Power Sanger LLC	C-4071-7-2	Cooling tower with drift eliminator
Ampersand Chowchilla Biomass LLC	C-6923-4-2	Cooling tower with drift eliminator (0.005% drift rate)
Panoche Energy Center LLC	C-7220-6-2	Cooling tower with drift eliminator (0.005% drift rate)
DTE Stockton, LLC	N-645-34-6	Cooling tower with a high efficiency drift eliminator (0.001% drift rate)
Northern California Power	N-2697-6-2	Cooling tower with a high efficiency drift eliminator (0.0005% drift rate)
Modesto Irrigation District	N-3233-5-4	Cooling tower with a high efficiency drift eliminator (0.0005% drift rate)
Merced Power, LLC	N-4607-9-2	Cooling tower with drift eliminator (0.005% drift rate)
Walnut Energy Center Authority	N-7172-3-2	Cooling tower with a high efficiency drift eliminator (0.0005% drift rate)
Covanta Delano Inc	S-75-19-4	Cooling tower
	S-75-20-4	Cooling tower
Mt Poso Cogeneration Energy	S-91-8-4	Cooling tower
Cres Inc dba Dinuba Energy	S-285-11-3	Cooling tower (0.025% drift rate)
CXA LA Paloma, LLC	S-3412-5-6	Cooling tower with a high efficiency drift eliminator (0.0006% drift rate)
	S-3412-6-6	Cooling tower with a high efficiency drift eliminator (0.0006% drift rate)
Elk Hills Power LLC	S-3523-3-5	Cooling tower with a high efficiency drift eliminator (0.0005% drift rate)
Pastoria Energy Facility LLC	S-3636-4-5	Cooling tower with a high efficiency drift eliminator (0.0005% drift rate)
	S-3636-5-5	Cooling tower with high efficiency cellular type drift eliminator (0.0005% drift rate)
Sunrise Power Co	S-3746-3-6	Cooling tower with a high efficiency drift eliminator (0.0006% drift rate)

The most stringent control in practice is a cooling tower equipped with a cellular drift eliminator with a 0.0005% drift rate.

3. Other Control Options Found:

No other control options have been found that can reduce PM_{10} emissions from induced draft, evaporative cooling towers.

4. Summary of BACT Guidelines and Survey of Permitted Sources:

Based on the above information, no current BACT guidelines were found that contain achieved in practice BACT requirements for induced draft, evaporative cooling towers. However, a survey of permitted sources indicates that a high efficiency cellular-type drift eliminator with a 0.0005% drift rate has been in use by multiple facilities, so this level of control is now considered to be achieved in practice.

Conclusion:

It is determined that the achieved in practice BACT option for induced draft, evaporative cooling towers at electrical power generation operations is a high efficiency cellular drift eliminator with a 0.0005% drift rate. There are no technologically feasible options.

Step 2 - Eliminate Technologically Infeasible Options

There are no technologically infeasible options listed in Step 1. The emission control option under consideration is based on current BACT requirements and current rule requirements. Therefore, no further discussion is required.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

1. High Efficiency Cellular-Type Drift Eliminator (0.0005% drift rate)

Step 4 - Cost Effectiveness Analysis

As discussed above, this BACT analysis is being performed as a proactive update to this BACT guideline and is not part of a specific permitting action. Therefore, a cost effective analysis is not necessary and will not be included as a part of this analysis.

Step 5 - Select BACT

This is a proactive determination that is not part of a specific permitting action. The achieved in practice control option is established in the guideline presented in Appendix A.

IV. Recommendation

A cellular-type drift eliminator is currently the technologically feasible option; however, as shown above, a high efficiency cellular-type drift eliminator with a 0.0005% drift rate is currently utilized by multiple facilities. As a result, a high efficiency cellular-type drift eliminator with a 0.0005% drift rate is now considered to be the Achieved in Practice requirement for this class and category of source.

Appendix
Appendix A: Proposed Draft BACT Guideline 8.3.10

Appendix B: Current BACT Guideline 8.3.10

Appendix A
Proposed Draft BACT Guideline 8.3.10

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Appendix B
Current BACT Guideline 8.3.10

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Equipment Rating: All

Last Update: June 19, 2000

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