SMAQMD BACT CLEARINGHOUSE

CATEGORY Type: **DRYER (NON PROCESS HTR)**

BACT Category: SMALL EMITTER (PTE < 10 LBS/DAY)

BACT Determination Number: 249	**BACT Determination Date:** 3/19/2020

Equipment Information

Permit Number: N/A -- Generic BACT Determination

Equipment Description: DRYER

Unit Size/Rating/Capacity: Commercial Laundry Dryer, Natural Gas < 5 MMBtu/hr

Equipment Location:

EXPIRED

BACT Determination Information

District Contact: Michelle Joe Phone No.: (916) 874 - 4853 email: mjoe@airquality.org

ROCs	**Standard:**	Natural gas fueled
	Technology Description:	
	Basis:	Achieved in Practice
NOx	**Standard:**	30ppmvd @ 3% O2
	Technology Description:	Low-NOx burner
	Basis:	Achieved in Practice
SOx	**Standard:**	Natural gas fueled
	Technology Description:	
	Basis:	Achieved in Practice
PM10	**Standard:**	75% control
	Technology Description:	Lint collector and natural gas fuel, or equal
	Basis:	Achieved in Practice
PM2.5	**Standard:**	75% control
	Technology Description:	Lint collector and natural gas fuel, or equal
	Basis:	Achieved in Practice
CO	**Standard:**	No standard
	Technology Description:	
	Basis:	
LEAD	**Standard:**	No standard
	Technology Description:	
	Basis:	

Comments: This is a generic BACT determination based on BACT determinations made, and published, by other air agencies in California and/or other States.

Printed: 3/23/2020

777 12th Street, Third Floor

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Sacramento, CA 95814

BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION

EXPIRED

DETERMINATION NO.:	249
DATE:	December 19, 2019
ENGINEER:	Michelle Joe

Category/General Equipment Description:	Dryer
Equipment Specific Description:	Commercial Laundry Dryer, Natural Gas Fired, < 5 MMBtu/hr
Equipment Size/Rating:	Small Emitter/Minor Source BACT
Previous BACT Det. No.:	115

This Best Available Control Technology (BACT) determination will update Determination #115, which was made on January 17, 2017. BACT #115 was made to update the previous BACT #70, which was made on July 10, 2014 for a 2.7 MMBtu/hr natural gas fired commercial laundry dryer under P/O 24265.

In addition, the District's Small Emitter and "Otherwise-Exempt Equipment" BACT Determinations policy states that units which are classified as small emitters (less than 10 lbs/day of VOC, NOx, SOx, PM10, or PM2.5 and less than 550 lbs/day of CO) and are located at non-major stationary sources are only required to meet BACT standards that have been achieved in practice. Therefore, this BACT determination will only be based on what is achieved in practice and will be only applied to small emitters at non-major sources. BACT will be evaluated on a case-by-case basis for units that do not fit this criteria.

The District reviewed all previously reviewed BACT clearinghouses and rules in BACT #115, and determined that no significant changes have occurred since the previous BACT #115 evaluation. However, the following distinctions are being made in this BACT determination update:

- whereas the previous BACT #70 and #115 did not specify a size category, the determinations were focused on dryers rated < 5 MMBtu/hr, and so this BACT determination update will identify this size category.
- this BACT determination only covers the commercial laundry drying of non-high turndown ratio (< 30:1) dryers. For commercial laundry dryers with a high turndown ratio (≥ 30:1), see SMAQMD BACT #175 – Laundry Dryer High Turndown Ratio (6/5/18).
- this BACT determination only covers commercial laundry drying of non-solvent laden materials.

Therefore, all other considerations made under the previous BACT will remain the same as reviewed below, unless otherwise noted.

BACT/T-BACT ANALYSIS

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

The following control technologies are currently employed as BACT/T-BACT for commercial laundry dryers, natural gas fired and rated < 5 MMBtu/hr by the following agencies and air pollution control districts:

US EPA

BACT:
Source: EPA RACT/BACT/LAER Clearinghouse

For Natural Gas Fired Commercial Laundry Dryer < 5 MMBtu/hr	
VOC	N/A – No BACT determinations found
NOx	N/A – No BACT determinations found
SOx	N/A – No BACT determinations found
PM10	N/A – No BACT determinations found
PM2.5	N/A – No BACT determinations found
CO	N/A – No BACT determinations found

The following process codes were reviewed:
(A) 19.600 – Misc. Boilers, Furnaces, Heaters
(B) 19.900 – Other Misc. Combustion

T-BACT:
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:
40 CFR Part 60 – New Source Performance Standards (NSPS):
There are currently no 40 CFR, Part 60 NSPS sections that apply to this source category.

40 CFR Part 61 – National Emission Standards for Hazardous Air Pollutants (NESHAPS):
There are currently no 40 CFR, Part 61 NESHAPs that apply to this source category.

40 CFR Part 63 – NESHAPS for Source Categories (MACT Standards):
There are currently no 40 CFR, Part 63 NESHAPs that apply to this source category.

California Air Resources Board (ARB)

BACT:
Source: ARB BACT Clearinghouse

For Dryer or Oven, Direct or Indirect	
VOC	N/A – No BACT determinations found
NOx	30 ppmvd corrected to 3% O_2
SOx	N/A – No BACT determinations found
PM10	N/A – No BACT determinations found
PM2.5	N/A – No BACT determinations found
CO	N/A – No BACT determinations found

(A) See Attachment A for a review of BACT determinations published by ARB.

T-BACT:
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:
ARB Airborne Toxic Control Measures (ATCM):
There are currently no ATCMs that apply to this source category.

Sacramento Metropolitan AQMD (SMAQMD)

BACT:
Source: SMAQMD BACT Clearinghouse

BACT #115 for Commercial Laundry Dryer, Natural Gas Fired (1/20/17)	
VOC	Natural gas fueled
NOx	30 ppmvd corrected to 3% O_2, Low-NOx burner
SOx	Natural gas fueled
PM10	75% control (lint collector and natural gas fuel, or equal)
PM2.5	75% control (lint collector and natural gas fuel, or equal)
CO	No standard

RULE REQUIREMENTS:
Rule 419 – NOx from Miscellaneous Combustion Units (amended 10/25/18)
This rule applies to any miscellaneous combustion unit with a total rated heat input capacity of 2 MMBtu per hour or greater located at a major stationary source of NOx (≥ 25 TPY of NOx) or with a total rated heat input capacity of 5 MMBtu per hour or greater located at any area source of NOx (< 25 TPY of NOx). For miscellaneous combustion units rated < 5 MMBtu

located at area sources, this rule does not apply.

South Coast AQMD (SCAQMD)

BACT:
Source: SCAQMD BACT Guidelines for Non-Major Polluting Facilities, page 45 (revised 2/1/2019)

For Tenter Frame Fabric Dryer	
VOC	No standard
NOx	30 ppmvd Compliance with Rule 1147 (2-1-2019)
SOx	Natural gas (10-20-2000)
PM10	Natural gas (10-20-2000)
PM2.5	No standard
CO	No standard

Source: SCAQMD LAER/BACT Determinations(A)

For Dryer or Oven – Dryer, Laundry A/N 391633 (12/6/02)	
VOC	No standard
NOx	30 ppmvd @ 3% O_2, Low-NOx burner
SOx	No standard
PM10	No standard
PM2.5	No standard
CO	No standard

(A) See Attachment B for a summary of the SCAQMD BACT determinations reviewed.

T-BACT:
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:
Regulation II, Rule 219 - Equipment Not Requiring a Written Permit Pursuant to Regulation II (amended 4/6/2018)
Boilers, process heaters, or any combustion equipment that has a rated maximum heat input capacity of 2,000,000 Btu per hour (gross) or less and are equipped to be heated exclusively with natural gas, methanol, liquified petroleum gas, or any combination thereof are exempt from the requirement to obtain a written permit. This exemption does not apply whenever there

are emissions other than products of combustion. Therefore, in practice, the BACT, LAER and Rule 1147 standards only apply to units with no other emissions other than products of combustion with a heat input greater than 2 MMBtu/hr.

Regulation XI, Rule 1147 - NOx Reductions from Miscellaneous Sources (amended 7/7/2017)
This rule applies to ovens, dryers, dehydrators, heaters, kilns, calciners, furnaces, crematories, incinerators, heated pots, cookers, roasters, fryers, closed and open heated tanks and evaporators, distillation units, afterburners, degassing units, vapor incinerators, catalytic or thermal oxidizers, soil and water remediation units and other combustion equipment with heat ratings greater than or equal to 325,000 Btu/hr with nitrogen oxide emissions that require a District permit **and are not** specifically required to comply with a nitrogen oxide emission limit by other District Regulation XI rules.

Table 1 – NOx Emission Limit for Units with Heat Rating ≥ 325,000 Btu/hour			
Equipment Category	Process Temperature		
Gaseous fuel-fired equipment	≤ 800° F	> 800 ° F and < 1200° F	≥ 1200 ° F
Oven, Dehydrator, Dryer, Heater, Kiln, Calciner, Cooker, Roaster, Furnace, or Heated Storage Tank	30 ppm or 0.036 lb/MMBtu	30 ppm or 0.036 lb/MMBtu	60 ppm or 0.073 lb/MMBtu

San Joaquin Valley APCD (SJVAPCD)

BACT:
Source: SJVAPCD BACT Clearinghouse (Searchable)

BACT Guideline 1.19.11 for Commercial Laundry Dryer < 5 MMBtu/hr Natural Gas Fired (2/19/03)		
Pollutant	Achieved in Practice or in the SIP	Technologically Feasible
VOC	No Standard	No Standard
NOx	No Standard	No Standard
SOx	No Standard	No Standard
PM10	75% control (lint collector and natural gas fuel, or equal)	1. 99% control (baghouse and natural gas fuel, or equal) 2. 90% control (venturi scrubber and natural gas fuel, or equal)
PM2.5	No Standard	No Standard
CO	No Standard	No Standard

T-BACT:
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:

Rule 4309 – Dryers, Dehydrators, and Ovens (adopted 12/15/05)

This rule applies to any dryer, dehydrator, or oven that has a total rated heat input of ≥ 5.0 MMBtu/hr, and therefore does not apply. However, the emission standards are listed below for reference:

SJVAPCD Rule 4309 Emission Standards ppmvd @ 3% O_2 (B) Rule 4309 §5.2, Table 1 for Gaseous Fuel Fired		
Process Description	NOx limit (B)	CO Limit (B)
Other processes (A)	40.5 ppm	395.6 ppm

(A) Excludes asphalt/concrete plants and milk, cheese, and dairy processing.
(B) Rule 4309's limits are in ppmvd @ 19% Oxygen. The values listed in the table have been corrected to 3% O_2 for comparison purposes.

San Diego County APCD (SDCAPCD)

BACT:
Source: NSR Requirements for BACT (dated 6/2011)

For Natural Gas Fired Commercial Laundry Dryer	
VOC	N/A – No BACT determinations found
NOx	N/A – No BACT determinations found
SOx	N/A – No BACT determinations found
PM10	N/A – No BACT determinations found
PM2.5	N/A – No BACT determinations found
CO	N/A – No BACT determinations found

Note: Pursuant to Rule 11 (amended 10/30/19), Section (d)(18)(iv), laundry dryers, extractors, or tumblers used for fabrics cleaned only with solutions of bleach or detergents, provided that the VOC content of detergents and additives used does not exceed 50 grams per liter (this exemption does not apply to equipment used for previously VOC-laden materials such as rags, cloths, etc.) are not required to obtain a permit and are therefore not subject to New Source Review (BACT).

T-BACT:
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:
Regulation 4, Rule 68 – Fuel-Burning Equipment – Oxides of Nitrogen (effective 9/20/1994)
This rule does not apply to fuel burning equipment which has a maximum input rating of < 50 MMBtu/hr.

Bay Area AQMD (BAAQMD)

BACT:
Source: BAAQMD BACT Guideline

For Natural Gas Fired Commercial Laundry Dryer	
VOC	N/A – No BACT determinations found
NOx	N/A – No BACT determinations found
SOx	N/A – No BACT determinations found
PM10	N/A – No BACT determinations found
PM2.5	N/A – No BACT determinations found
CO	N/A – No BACT determinations found

T-BACT:
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:
Reg 8, Rule 2 – Organic Compounds from Miscellaneous Operations §8-2-110 (amended 7/20/05)
This rule for organic compound emissions exempts any operation consisting entirely of natural gas, and therefore does not apply.

Reg 9, Rule 3 – Inorganic Gaseous Pollutants; NOx from Heat Transfer Operations §9-3-301 (amended 3/17/82)
This rule does not apply to any new or modified heat transfer operation designed for a maximum heat input of less than 264 GJ (250 MMBtu).

Summary of Achieved in Practice Control Technologies

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

SUMMARY OF ACHIEVED IN PRACTICE CONTROL TECHNOLOGIES	
VOC	1. Natural gas fueled [SMAQMD, BAAQMD] 2. No standard [EPA, ARB, SCAQMD, SJVAPCD, SDCAPCD]
NOx	1. 30 ppmvd @ 3% O_2, Low-NOx burner [ARB, SMAQMD, SCAQMD] 2. No standard [EPA, ARB, BAAQMD, SDCAPCD]
SOx	1. Natural gas fueled [SMAQMD, SCAQMD] 2. No standard [EPA, ARB, SJVAPCD, SDCAPCD, BAAQMD]
PM10	1. 75% control (lint collector and natural gas fuel, or equal) [SMAQMD, SJVAPCD] 2. Natural gas [SCAQMD] 3. No standard [EPA, ARB, SDCAPCD, BAAQMD]
PM2.5	1. 75% control (lint collector and natural gas fuel, or equal) [SMAQMD] 2. No standard [EPA, ARB, SCAQMD, SJVAPCD, SDCAPCD, BAAQMD]
CO	1. No standard [EPA, ARB, SMAQMD, SCAQMD, SJVAPCD, SDCAPCD, BAAQMD]

The following control technologies have been identified as the most stringent, achieved in practice control technologies:

BEST CONTROL TECHNOLOGIES ACHIEVED		
Pollutant	**Standard**	**Source**
VOC	Natural gas fueled	SMAQMD, BAAQMD
NOx	30 ppmvd @ 3% O_2, Low-NOx burner	ARB, SMAQMD, SCAQMD
SOx	Natural gas fueled	SMAQMD, SCAQMD
PM10	75% control (lint collector and natural gas fuel, or equal)	SMAQMD, SJVAPCD
PM2.5	75% control (lint collector and natural gas fuel, or equal)	SMAQMD
CO	No standard	EPA, ARB, SMAQMD, SCAQMD, SDCAPCD, BAAQMD, SJVAPCD

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

Since the previous BACT #115 determination on 1/20/17, the District's Small Emitter and "Otherwise-Exempt Equipment" BACT Determinations policy (dated 5/16/2019) was approved, which states that units which are classified as small emitters (less than 10 lbs/day of VOC, NOx, SOx, PM10, or PM2.5 and less than 550 lbs/day of CO) and are located at non-major stationary sources are only required to meet BACT standards that have been achieved in practice. Therefore, this BACT determination will only be based on what is achieved in practice and will only be applied to small emitters at non-major sources. BACT will be evaluated on a case-by-case basis for units that do not fit these criteria.

However, for reference purposes, the previous BACT #115's technologically feasible and cost effective analysis will be included below:

Technologically Feasible Determination

When evaluating technologies not yet considered achieved in practice, the District uses a top-down approach to consider any alternative basic equipment, fuel, process, emission control device or technique, singly or in combination, determined to be technologically feasible by the Air Pollution Control Officer.

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

Pollutant	Technologically Feasible Alternatives
VOC	No other technologically feasible option identified
NOx	No other technologically feasible option identified
SOx	No other technologically feasible option identified
PM10	1. 99% control (baghouse and natural gas fuel, or equal) [SJVAPCD] 2. 90% control (venturi scrubber and natural gas fuel, or equal) [SJVAPCD]
PM2.5	Same as above for PM10 (assuming all PM10 falls within the PM2.5 range)
CO	No other technologically feasible option identified

Cost Effective Determination

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

Maximum Cost per Ton of Air Pollutants Controlled

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

Pollutant	Maximum Cost ($/ton)
ROG	17,500
NOx	24,500
PM10	11,400
SOx	18,300
CO	TBD if BACT triggered

Baghouse Cost Effectiveness Analysis

Since the cost assumptions from Section 6 – Particulate Matter Controls, Chapter 1 – Baghouses and Filters from EPA's Air Pollution Control Cost Manual, Sixth Edition, EPA/452/B-02-001, January 2002 has remained unchanged since the previous BACT #115 (as verified in EPA's Updated Chapters and Related Documents website), the previously-calculated cost effectiveness analysis remains the same and will be included here for reference. The cost effectiveness for the add-on baghouse to control PM10 was calculated to be $18,139 per ton (see Attachment C – Baghouse Cost Effectiveness Analysis). The following basic parameters were used in the analysis.

PM10 Control Level = 99%

PM10 Baseline Level= 1.82 ton PM10/year (9.9 lb/day x 92 days/quarter x 4 quarters)

Equipment Life = 10 years

Direct Cost = $54,076

Indirect Cost = $0

Direct Annual Cost = $14,814

Indirect Annual Cost = $18,054

Total Annual Cost = $32,868

PM10 Removed = 1.81 tons

Cost of PM10 Removal = $18,139 per ton reduced

Therefore, the add-on baghouse is not considered cost effective and is eliminated.

Venturi Scrubber Cost Effectiveness Analysis

Since the cost assumptions from Section 6 – Particulate Matter Controls, Chapter 2 – Wet Scrubbers for Particulate Matter from EPA's Air Pollution Control Cost Manual, Sixth Edition, EPA/452/B-02-001, January 2002 has remained unchanged since the previous BACT #115 (as verified in EPA's Updated Chapters and Related Documents website), the previously-calculated cost effectiveness analysis remains the same and will be included here for reference. The cost effectiveness for the add-on venturi scrubber to control PM10 was calculated to be $40,225 per ton (see Attachment D – Venturi Scrubber Cost Effectiveness Analysis). The following basic parameters were used in the analysis.

PM10 Control Level = 90%

PM10 Baseline Level= 1.82 ton PM10/year (9.9 lb/day x 92 days/quarter x 4 quarters)

Equipment Life = 10 years

Direct Cost = $105,351

Indirect Cost = $23,636

Direct Annual Cost = $29,627

Indirect Annual Cost = $39,640

Total Annual Cost = $69,267

PM10 Removed = 1.64 tons

Cost of PM10 Removal = $40,225 per ton reduced

Therefore, the add-on venturi scrubber is not considered cost effective and is eliminated.

Using the PM10 BACT standard for PM2.5

Lint traps and natural gas fuel is already required as achieved in practice BACT for PM10 [SJVAPCD]. Since both PM10 and PM2.5 trigger BACT at >0 lb/day and PM2.5 is a subset of PM10 for both natural gas combustion and lint generation, BACT for PM2.5 will be triggered whenever BACT is triggered for PM10. Therefore, there is no additional cost associated with requiring lint traps and natural gas as BACT for PM2.5 for new emission units.

C. SELECTION OF BACT:

Based on the above analysis, BACT for VOC, NOx, SOx, PM10, PM2.5, and CO will remain at what is currently achieved in practice.

BACT #249 – COMMERCIAL LAUNDRY DRYER, NATURAL GAS FIRED, < 5 MMBTU/HR		
Pollutant	**Standard**	**Source**
VOC	Natural gas fueled	SMAQMD, BAAQMD
NOx	30 ppmvd @ 3% O_2, Low-NOx burner	ARB, SMAQMD, SCAQMD
SOx	Natural gas fueled	SMAQMD, SCAQMD
PM10	75% control (lint collector and natural gas fuel, or equal)	SMAQMD, SJVAPCD
PM2.5	75% control (lint collector and natural gas fuel, or equal)	SMAQMD
CO	No standard	EPA, ARB, SMAQMD, SCAQMD, SDCAPCD, BAAQMD, SJVAPCD

D. SELECTION OF T-BACT:

There are no Federal NSPSs, NESHAPs, or State ATCMs for this source category. None of the sources surveyed have any toxic T-BACT determinations published. Therefore, T-BACT standards will be considered as meeting the BACT standards identified above.

APPROVED BY: *Brian F Krebs* **DATE:** **3/19/20**

Attachment A

Review of BACT Determinations published by ARB

List of BACT determinations published in ARB's BACT Clearinghouse for **Dryer or Oven, Direct or Indirect**:

Capacity	Source	Date	NOx	VOC	CO	PM10
4.0 MMBtu/hr (A)	SCAQMD	12/01/1999	30 ppmvd @ 3% O_2	N/A	2000 ppmvd @ 15% O_2	0.1 grains/scf
6 MMBtu/hr (B)	SCAQMD	05/01/2000	60 ppmvd @ 3% O_2	N/A	N/A	N/A
3.5 MMBtu/hr, Average load equals 1.5 MMBtu/hr (C)	SCAQMD	10/27/2001	30 ppmvd @ 3% O_2	N/A	N/A	N/A
5 MMBtu/hr (D)	SCAQMD	02/06/2002	30 ppmvd @ 3% O_2	For powder coating operation only: 780 lb/month (facilitywide)	N/A	N/A
5.4 MMBtu/hr (E)	SCAQMD	12/07/2001	18 ppmvd @ 3% O_2	N/A	N/A	N/A
1.9 MMBtu/hr (F)	SCAQMD	05/27/2003	30 ppmvd @ 3% O_2	N/A	N/A	5 ppmvd
96 MMBtu/hr (G)	SCAQMD	01/02/1997	6 ppmvd @ 15% O_2	N/A	N/A	2000 ppmvd @ 15% O_2

(A) Dryer used to soften polystyrene sheet.
(B) Tenter frame fabric dryer used to dry cotton and cotton blended fabrics.
(C) Tumbler dryer used for drying clothes (commercial laundry)
(D) Conveyorized powder coating curing oven with a maximum turn-down requirement of 5:1 and 400-600 ºF operating temperature.
(E) Polyethylene resin melting and curing; NOx limit requested as RECLAIM concentration limit.
(F) Direct-fired makeup air heater to control booth temperature; 70-130 ºF operating temperature.
(G) Conveyorized three-zone, 8-layer (no other notes given in description).

= Dryer/oven not used for commercial laundry and therefore not part of the scope of this determination.

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

Attachment B

BACT Determinations Published by SCAQMD

Section I: AQMD BACT Determinations

Application No.: 391633

Equipment Category – Dryer or Oven

1. GENERAL INFORMATION				DATE: 9/6/2002
A. MANUFACTURER: American Laundry				
B. TYPE: Tumbler		C. MODEL: 438		
D. STYLE:				
E. APPLICABLE AQMD RULES: None				
F. COST: $ (NA)	SOURCE OF COST DATA:			
G. OPERATING SCHEDULE:	14 HRS/DAY	5 DAYS/WK	52 WKS/YR	

2. EQUIPMENT INFORMATION				APP. NO.: 391633
A. FUNCTION: Clothes dryer				
B. MAXIMUM HEAT INPUT: 3.5 MMBtu/hr		C. MAXIMUM THROUGHPUT: Two 800 lb loads/hr		
D. BURNER INFORMATION:	NO.: 1	TYPE: Low-NOx		
E. PRIMARY FUEL: Natural Gas		F. OTHER FUEL: LPG		
G. OPERATING CONDITIONS: Average load = 30%. Average heat input = 1.5 MMBtu/hr				

3. COMPANY INFORMATION				APP. NO.: 391633
A. NAME: Aramark Uniform Services			B. SIC CODE: 7218	
C. ADDRESS: 4422 E. Dunham Street CITY: Los Angeles		STATE: CA	ZIP: 90023	
D. CONTACT PERSON: Yevgenu (Gene) Sherman			E. PHONE NO.: 323-266-0555	

4. PERMIT INFORMATION				APP. NO.: 391633
A. AGENCY: SCAQMD		B. APPLICATION TYPE: new construction		
C. AGENCY CONTACT PERSON: Amir Dejbakhsh			D. PHONE NO.: 909-396-2618	
E. PERMIT TO CONSTRUCT/OPERATE INFORMATION:	P/C NO.:		ISSUANCE DATE:	
☒ CHECK IF NO P/C	P/O NO.: F45790		ISSUANCE DATE: 10/27/2001	
F. START-UP DATE: Late in 2000				

5. EMISSION INFORMATION		APP. NO.: 391633
A. PERMIT		
A1. PERMIT LIMIT: NOx not to exceed 30 PPM at 3% O2		
A2. BACT/LAER DETERMINATION: NOx not to exceed 30 PPM at 3% O2		
A3. BASIS OF THE BACT/LAER DETERMINATION: Part D of BACT Guidelines		
B. CONTROL TECHNOLOGY		
B1. MANUFACTURER/SUPPLIER: Maxon		

Combustion equipment form date 7/17/2002

5. EMISSION INFORMATION

APP. NO.: 391633

B2. TYPE: Cyclomax

B3. DESCRIPTION: Low-NOx burner

B4. CONTROL EQUIPMENT PERMIT APPLICATION DATA: P/C NO.: ISSUANCE DATE:
P/O NO.: ISSUANCE DATE:

B5. WASTE AIR FLOW TO CONTROL EQUIPMENT: FLOW RATE:
ACTUAL CONTAMINANT LOADING: BLOWER HP:

B6. WARRANTY: 30 PPM NOx, corrected to 3% O2

B7. PRIMARY POLLUTANTS: NOx, CO, SOx, PM10

B8. SECONDARY POLLUTANTS: None

B9. SPACE REQUIREMENT:

B10. LIMITATIONS: B11. UNUSED

B12. OPERATING HISTORY: This unit has been operating for nearly two years, with no significant operational problems.

B13. UNUSED B14. UNUSED

C. CONTROL EQUIPMENT COSTS

C1. CAPITAL COST: ☐ CHECK IF INSTALLATION COST IS INCLUDED IN EQUIPMENT COST
EQUIPMENT: $ INSTALLATION: $ (NA) SOURCE OF COST DATA:

C2. ANNUAL OPERATING COST: $ (NA) SOURCE OF COST DATA:

D. DEMONSTRATION OF COMPLIANCE

D1. STAFF PERMFORMING FIELD EVALUATION:
ENGINEER'S NAME: INSPECTOR'S NAME: Victor Yip DATE: 4/9/2002

D2. COMPLIANCE DEMONSTRATION: No problems with tumbler operation noted.

D3. VARIANCE: NO. OF VARIANCES: DATES:
CAUSES:

D4. VIOLATION: NO. OF VIOLATIONS: 1 DATES: 4/9/2002
CAUSES: Late with Rule 1146 testing of water heater

D5. MAINTENANCE REQUIREMENTS: D6. UNUSED

D7. SOURCE TEST/PERFORMANCE DATA RESULTS AND ANALYSIS:
DATE OF SOURCE TEST: Not required CAPTURE EFFICIENCY:
DESTRUCTION EFFICIENCY: OVERALL EFFICIENCY:
SOURCE TEST/PERFORMANCE DATA:
OPERATING CONDITIONS:
TEST METHODS:

6. COMMENTS

APP. NO.: 391633

Attachment C

Baghouse Cost Effectiveness Analysis

BAGHOUSE COST EFFECTIVENESS CALCULATION

EPA AIR POLLUTION CONTROL COST MANUAL, Sixth Edition, EPA/452/B-02-001, January 2002

Section 6 - Particulate Matter Controls, Chapter 1 - Baghouses and Filters

Capital Costs

Direct Costs	Factor		Cost
Purchased equipment costs			
Fabric filter (Bid from Air Dynamics, requested by G&K)			$ 35,029
Bags and cages			$ -
Auxillary equipment			$ -
Total = A			$ 35,029
Instrumentation		0.10 A	$ 3,503
California Sales taxes		0.085 A	$ 2,977
Freight		0.05 A	$ 1,751
Purchased equipment costs, PEC	B=	1.24 A	$ 43,261
Direct installation costs		0.25 B	$ 10,815
Section 1.4.3 of the Cost Control Manual estimates that for prepackaged units, the installation costs would be 20-25% of the purchased equipment cost (B).			
Site Preparation	As required, SP		$ -
Buildings	As required, Bldg.		$ -
Total Direct Cost, DC	**1.74 B + SP + Bldg.**		**$ 54,076**
Indirect Costs (installation) - included with direct installation costs			
Engineering		0.00 B	$ -
Construction and field expense		0.00 B	$ -
Contractor fees		0.00 B	$ -
Start-up		0.00 B	$ -
Performance test		0.00 B	$ -
Contingencies		0.00 B	$ -
Total Indirect Cost, IC		**0.00 B**	**$ -**
Total Capital Investment (rounded) = DC + IC	**2.19 B + SP + Bldg.**		**$ 54,076**

BAGHOUSE COST EFFECTIVENESS CALCULATION (continued)				
Annual Costs				
Direct Annual Costs, DAC	Factor			Cost
Operating Labor				
Operator labor cost, O ($13.25/hr, 1 hr/8 hr shift, 2 shifts/day 260 days/yr)			$	6,890
*Hourly Rate provided by G&K Services				
Supervisor labor cost	15%	of O	$	1,034
Operating Labor Total, OL			$	7,924
Maintenance Labor				
Labor, L ($13.25/hr, 0.5 hr/8 hr shift, 2 shifts/day 260 days/yr)			$	3,445
Material	100%	of L	$	3,445
Utilities				
Electricity (system is passive due to high flow rate from dryer)			$	-
Replacement Parts			$	-
Total DAC			**$**	**14,814**
Indirect Annual Costs, IAC				
Overhead	60%	OL+ML	$	8,888.10
Administrative charges	2%	DC+IC	$	1,081.52
Property Tax	1%	DC+IC	$	541
Insurance	1%	DC+IC	$	540.76
Captial recovery (10-year equipment life, 5% interest)	0.129505	DC+IC	$	7,003.09
Total IAC			**$**	**18,054**
Total Annual Cost		**DAC + IAC**	**$**	**32,868**

Emission Control Cost Calculation - Baghouse

Pollutant	Annual PM tons/year [1]	Control Efficiency %	Reduction tons PM/year	Control Cost $/Ton Rem
Particulate Matter (PM)	1.82	99%	1.81	$ 18,139

[1] Proposed permit limit of 9.9 lb PM/day. EF has assumes that PM = PM10.

Attachment D

Venturi Scrubber Cost Effectiveness Analysis

VENTURI SCRUBBER COST EFFECTIVENESS CALCULATION

EPA AIR POLLUTION CONTROL COST MANUAL, Sixth Edition, EPA/452/B-02-001, January 2002

Section 6 - Particulate Matter Controls, Chapter 2 - Wet Scrubbers for Particulate Matter

Capital Costs

Direct Costs	Factor		Cost
Purchased equipment costs			
Venturi Packaged Unit (Qsat = 9,000 acfm)	4.5 Qsat + 19,000	$	59,500
Auxiliary Costs (assumed to be include per Section 6, Chapter 2, Table 2.5)		$	-
Equipment Costs (assumed to be include per Section 6, Chapter 2, Table 2.5)		$	-
Total = A		$	59,500
Instrumentation (assumed to be include per Section 6, Chapter 2, Table 2.5)	0.00 A	$	-
California Sales taxes	0.085 A	$	5,058
Freight	0.05 A	$	2,975
Purchased equipment costs, PEC	B= 1.14 A	$	67,533
Direct installation costs			
Foundations & supports	0.06 B	$	4,052
Handling & erection	0.40 B	$	27,013
Electrical	0.01 B	$	675
Piping	0.05 B	$	3,377
Insulation for ductwork	0.03 B	$	2,026
Painting	0.01 B	$	675
Direct installation costs	0.56 B	$	37,818
Site Preparation	As required, SP	$	-
Buildings	As required, Bldg.	$	-
Total Direct Cost, DC	**1.56 B + SP + Bldg.**	**$**	**105,351**
Indirect Costs (installation)			
Engineering	0.10 B	$	6,753
Construction and field expense	0.10 B	$	6,753
Contractor fees	0.10 B	$	6,753
Start-up	0.01 B	$	675
Performance test	0.01 B	$	675
Contingencies	0.03 B	$	2,026
Total Indirect Cost, IC	**0.35 B**	**$**	**23,636**
Total Capital Investment (rounded) = DC + IC	**2.19 B + SP + Bldg.**	**$**	**129,000**

VENTURI SCRUBBER COST EFFECTIVENESS CALCULATION (continued)				
Annual Costs				
Direct Annual Costs, DAC	Factor			Cost
Operating Labor				
Operator labor cost, O ($13.25/hr, 2 hr/8 hr shift, 2 shifts/day 260 days/yr)			$	13,780
Supervisor labor cost	15%	of O	$	2,067
Operating Labor Total, OL			$	15,847
Maintenance Labor				
Labor, L ($13.25/hr, 1 hr/8 hr shift, 2 shifts/day 260 days/yr)			$	6,890
Material	100%	of L	$	6,890
Total DAC			**$**	**29,627**
Indirect Annual Costs, IAC				
Overhead	60%	OL+ML	$	17,776.20
Administrative charges	2%	DC+IC	$	2,580
Property Tax	1%	DC+IC	$	1,290
Insurance	1%	DC+IC	$	1,289.87
Captial recovery (10-year equipment life, 5% interest)	0.129505	DC+IC	$	16,704.42
Total IAC			**$**	**39,640**
Total Annual Cost		**DAC + IAC**	**$**	**69,267**

Emission Control Cost Calculation - Venturi Scrubber

Pollutant	Annual PM tons/year [1]	Control Efficiency %	Reduction tons PM/year	Control Cost $/Ton Rem
Particulate Matter (PM)	1.8	90%	1.7	$ 40,225

[1] Proposed permit limit of 9.9 lb PM/day. G&K has assumed that PM = PM10.