



ENGINEERING AND COMPLIANCE

APPLICATION PROCESSING AND CALCULATIONS

APPL. NO. 511293, -94 & -95	DATE: 08/06/10
PROCESSED BY S. JIANG	CHECKED BY D. GORDON

EVALUATION REPORT FOR PERMIT TO CONSTRUCT

Applicant's Name: DART CONTAINER CORP OF CALIFORNIA Facility ID: 3721

Mailing Address: 150 SOUTH MAPLE STREET
CORONA, CA 92880-1704

Equipment Location: SAME

EQUIPMENT DESCRIPTION

Appl. No. 511293 – Change of Condition for Process 10 System 1, D229 (PC 347376) - **Lead Application!**

No Equipment Description Change

Appl. No. 511295 – Change of Condition for Process 9 System 2, C224 (PC 347394)

No Equipment Description Change

Equipment	ID No.	Connected to	RECLAIM Source Type/ Monitoring Unit	Emission and Requirements	Conditions
Process 9: APC EQUIPMENT FOR DI & DI RECLAIM FOAM MANUFACTURING					
System 2: OXIDIZER					
OXIDIZER, HOT-BED, THERMAL REGENERATIVE, TWO BEDS , SMITH ENVIRONMENTAL, NATURAL GAS, WITH A 250-HP BLOWER, WITH LOW EXCESS-AIR FIRING, 8 MMBTU/HR WITH A/N: 347394 511295 BURNER, NATURAL GAS, ECLIPSE, MODEL RATIOMATIC, WITH LOW NOX BURNER, 8 MMBTU/HR BURNER, NATURAL GAS INJECTION MODE, 7 MMBTU/HR	C224	D203 D204 D206 D207 D211 D213 D220 C250 D251 D252	NOX: PROCESS UNIT**	CO: 2000 PPMV NATURAL GAS (5) [RULE 407, 4-2-1982]; NOX: 30 1 PPMV NATURAL GAS (3) [RULE 2012, 5-6-2005] NOX: 30 1 PPMV NATURAL GAS (4) [RULE 2005, 5-6-2005]; NOX: 130 LBS/MMCF NATURAL GAS (1) [RULE 2012, 5-6-2005]; PM: 0.1 GRAINS/SCF (5) [RULE 409, 8-7-1981]; PM: (9) [RULE 404, 2-7-1986]; VOC: (9) [RULE 1175, 5-13-1994; RULE 1175, 9-7-2007]	A99.1, A99.2, B59.1, D28.1, D28.2, D29.1, D94.1, E193.1, K40.1, K48.1
Process 10: OPS MANUFACTURING					P13.2
System 1: OPS PROCESSING					
EXTRUDER, OPS, LINE 1, DAVIS STANDARD, POLYSTYRENE A/N: 347376 511293	D226	C244		PM: (9) [RULE 405, 2-7-1986]	B59.2, C1.8, D323.2



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OVEN, FIVE ZONE BURNER, NATURAL GAS, MAXON, 4.2 MMBTU/HR WITH A/N: 347376 511293 BURNER, WITH LOW NOX BURNER, 4.2 MMBTU/HR	D227		NOX: PROCESS UNIT**	CO: 2000 PPMV NATURAL GAS (5) [RULE 407, 4-2-1982]; NOX: 30 PPMV NATURAL GAS (3) [RULE 2012, 5-6-2005]; NOX: 30 PPMV NATURAL GAS (4) [RULE 2005, 5-6-2005]; PM: (9) [RULE 404, 2-7-1986]; PM: 0.1 GRAINS/SCF (5) [RULE 409, 8-7-1981]	C6.2, D28.1, D28.2, D28.3, D323.2, K40.1
FORMING MACHINE, THERMOFORMERS & TRIM PRESSES, IRWIN MODEL 48 & 50 COMMON TO D-226, 227, 230, & 231, 14 2 TOTAL A/N: 347376 511293	D229				D323.2

Appl. No. 511294 – Minor Title V Facility Permit Revision

Revision of Title V Facility Permit per Rule 301(1)(7).

PERMIT CONDITIONS

The following permit conditions are revised:

A99.1 *The 130 LBS/MMCF NOX emission limit(s) shall only apply to the operation of the Eclipse start-up burner. The operator shall report NOx emissions from the RTO as the sum of emissions from the operations of burner mode and gas injection mode. The NOx emissions from the operation of start-up burner mode shall be determined based on the 130 LBS/MMSCF and the natural gas used by the Eclipse start-up burner.*

To comply with this condition, the operator shall install and maintain a(n) flow meter to accurately indicate the fuel usage being supplied to the Eclipse start-up burner.

[RULE 2012, 5-6-2005]

[Devices subject to this condition: C224]

A99.2 *The 1 PPM NOX emission limit(s) shall only apply to the operation of the RTO natural gas injection mode. The operator shall report NOx emissions from the RTO as the sum of emissions from the operations of burner mode and gas injection mode. The NOx emissions from the operation of gas injection mode shall be determined based on the 1 PPM stack concentration limit and the actual stack flow rate measured by the stack flow monitor.*

To comply with this condition, the operator shall install and maintain a District-certified continuous flue gas flow monitoring system to accurately indicate the flue gas flow from the RTO.

[RULE 2012, 5-6-2005]

[Devices subject to this condition: C224]

C1.8 *The operator shall limit the material processed to no more than 64.8 ton(s) in any one day.*



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For the purpose of this condition, material processed shall be defined as polystyrene pellets.

The operator shall maintain records in a manner approved by the District, to demonstrate compliance with this condition.

[RULE 1303(b)(2)-Offset, 5-10-1996; RULE 1303(b)(2)-Offset, 12-6-2002]

[Devices subject to this condition: D226]

D28.1 The operator shall conduct source test(s) in accordance with the following specifications:

The test shall be conducted to demonstrate compliance with the source testing requirements of Rule 2012 for a Process Unit opting to comply with a NOx concentration limit.

The test shall be conducted after a source test protocol is submitted by the applicant and approved by the District.

The test shall be conducted within 12 months after issuance of this permit and once every 5-year period with the first 5 year period ending June 30, ~~2005~~ 2015.

The District shall be notified of the date and time of the test at least 10 days prior to the test.

[RULE 2012, 5-6-2005]

[Devices subject to this condition: C224, ~~D227~~]

~~D28.2 — The operator shall conduct source test(s) in accordance with the following specifications:~~

~~The test shall be conducted within 60 days after achieving maximum production rate, but no later than 180 days after initial start-up.~~

~~The test shall be conducted to include, but not be limited to, test of inlet to the afterburner, and the afterburner exhaust for; 1) volatile organic compound (VOC) in PPMV and lbs/hr, 2) benzene in lbs/hr during Natural gas combustion (exhaust only), 3) oxides of nitrogen (NOx) and carbon monoxide (CO) at start-up and during normal operation (exhaust only).~~

~~The test shall be conducted to determine the flow rate in ACFM and DSCFM.~~

~~The test shall be conducted to determine the collection, destruction, and overall control efficiency based on the mass of VOC used in the basic equipment/process served by this control system. The test data shall be adequate to establish an emission factor for calculating the emissions for DI & DI reclaim process.~~

~~The test shall be conducted to determine the usage of all VOC containing materials in the basic equipment/process during the test and their respective VOC contents/emission factors shall be recorded.~~

~~The test shall be conducted to determine the VOC in the product manufactured during the test immediately after production, 48 hours after production, and one year after production.~~

~~The test shall be conducted according to District approved protocol. A source test protocol shall be submitted to the District not later than 45 days before the proposed test date and shall be approved by the District before the test commences. The protocol shall include the proposed operating conditions of the basic & control~~



SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

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~~equipment during the test, the identity of the testing laboratory, a statement from the testing laboratory certifying it meets the criteria in District Rule 304(k), and description of all sampling and analytical.~~

~~The District shall be notified of the date and time of the test at least 7 days prior to the test.~~

~~[RULE 1303(a)(1) BACT, 5-10-1996; RULE 1303(a)(1) BACT, 12-6-2002]~~

~~[Devices subject to this condition: C224]~~

~~D28.3 — The operator shall conduct source test(s) in accordance with the following specifications:~~

~~The test shall be conducted within 60 days after achieving maximum production rate, but no later than 180 days after initial start-up.~~

~~The District shall be notified of the date and time of the test at least 10 days prior to the test.~~

~~The test shall be conducted to determine the flowrate in ACFM and DSFM.~~

~~The test shall be conducted after a source test protocol is submitted by the applicant and approved by the District.~~

~~The test shall be conducted to determine NOx emissions in ppmv (corrected at 3 percent O2) & lbs/hr, at the heater exhaust.~~

~~[RULE 1303(a)(1) BACT, 5-10-1996]~~

~~[Devices subject to this condition: D227]~~

D28.2 The operator shall conduct source test(s) in accordance with the following specifications:

The test shall be conducted to demonstrate compliance with the source testing requirements of Rule 2012 for a Process Unit opting to comply with a NOx concentration limit.

The test shall be conducted pursuant to Rule 2012, Appendix A, Chapter 5, Subdivision H – Alternative Method for Demonstrating Compliance with Concentration Limit.

The test shall be conducted after a source test protocol is submitted by the applicant and approved by the District.

The test shall be conducted within 12 months after issuance of this permit and once every 5-year period with the first 5 year period ending June 30, 2015.

The District shall be notified of the date and time of the test at least 10 days prior to the test.

[RULE 2012, 5-6-2005]

[Devices subject to this condition: D227]

D29.1 The operator shall conduct source test(s) for the pollutant(s) identified below:

<i>Pollutant(s) to be tested</i>	<i>Required Test Method(s)</i>	<i>Averaging Time</i>	<i>Test Location</i>
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VOC	<i>Method(s) specified in District Rule 1175</i>	<i>District-approved averaging time</i>	<i>Protocol to indicate test locations for collection efficiency demonstration</i>
VOC	<i>Method(s) specified in District Rule 1175</i>	<i>District-approved averaging time</i>	<i>Inlet and outlet simultaneously of oxidizer</i>

The test(s) shall be conducted to demonstrate compliance with Rule 1175.

The test shall be conducted at least once every five years.

Notwithstanding the source test requirements of Section E of this facility permit, the facility permit holder shall submit the protocol to the AQMD engineer at least 365 days prior to the expiration date of this Title V Facility Permit unless otherwise approved in writing by the District, and notify the District of the date and time of the test at least 10 days prior to the test.

The test shall be conducted at least 180 days prior to the expiration date of this Title V Facility Permit unless otherwise approved in writing by the District.

Source test shall be conducted in accordance with the equipment configuration and operation specified in the test protocol approved in writing by the District.

The source test shall be conducted when this equipment is operating at a temperature of not less than the minimum operating temperature specified in this permit. If the operating temperature during the source test is greater than the minimum operating temperature specified in this permit, the minimum operating temperature may be increased to reflect the operating temperature during the source test.

The operator shall also provide to the District a source test report containing, at a minimum, the following information:

<u><i>Required data</i></u>	<u><i>Reported As</i></u>
<i>Collection efficiency of emission collection system</i>	<i>Under actual test condition</i>
<i>Destruction efficiency of oxidizer</i>	<i>Under actual test condition</i>
<i>VOC emissions in ppmV and lbs/hr to support collection efficiency and destruction efficiency results</i>	<i>Under actual test condition</i>
<i>VOC emission factor for DI & DI reclaim processes</i>	<i>Lbs VOC per 100 lbs raw materials</i>
<i>Operating temperature of oxidizer</i>	<i>Degrees Fahrenheit</i>
<i>Blowing agent process rate</i>	<i>Lbs blowing agent per 100 lbs raw material processed</i>
<i>Residual blowing agent content in product</i>	<i>Lbs blowing agent per 100 lbs raw material processed</i>

Notwithstanding the requirements of Section E conditions, the source test results shall be submitted to the District no later than 60 days after the source test was conducted.



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[[RULE 1175, 5-13-1994](#); [Rule 1175, 9-7-2007](#); [RULE 1303\(a\)\(1\)-BACT, 5-10-1996](#); [RULE 1303\(a\)\(1\)-BACT, 12-6-2002](#); [RULE 3004\(a\)\(4\)-Periodic Monitoring, 12-12-1997](#)]

[Devices subject to this condition: C224]

BACKGROUND/HISTORY

Dart Container Corporation in Corona (Dart) manufactures food serving polystyrene products, which indicated as follows:

1. Expanded Poly-Styrene (EPS) foam cups
2. Extruded Poly-Styrene (XPS) foam, or called Direct Injection (DI) foam products such as plates, bowls and trays.
3. Transparent Oriented Poly-Styrene (OPS) plastic containers such as cups, plates, lids etc.
4. Opaque High Impact Poly-Styrene (HIPS) plastic lids

Dart is a Title V and NOx RECLAIM facility. The initial Title V Permit for the facility was issued on March 26, 2001 and expired on March 25, 2006. A Title V Permit Renewal application (A/N: 448877) was submitted on September 21, 2005, and the proposed renewal permit will be submitted to EPA for review simultaneously with the subject permit revision.

On May 27, 2010; Dart submitted three applications as indicated below:

<u>Appl. No.</u>	<u>Type</u>	<u>Previous Permit No.</u>	<u>Equipment</u>
511293	Change of Condition	P/C 347376	Tenter Frame Oven (D227)
511294	Plan	N/A	Title V / RECLAIM Permit Revision
511295	Change of Condition	P/C 347394	RTO (C224)

Appl. No. 511293 was submitted as an expedited class-I application, to allow “Rule 2012, Appendix A, Chapter 5, Subdivision H - Alternative Method for Demonstrating Compliance with Concentration Limit” be used for the required compliance verification test.

Based on Rule 2012, this oven is required to be tested once in five years to verify the compliance the NOx concentration limit of 30 ppmv @ 3% O₂. However, because the exhaust air stream is expected to have O₂ concentration greater than 19% and CO₂ concentration less than 1%, the facility cannot demonstrate compliance with the 30 ppmv @ 3% O using the dry F factor approach. Therefore, based on Rule 2012, Appendix A, Chapter 5, Subdivision B. Paragraph 3.a., the facility submitted this application to request the compliance verification test be conducted using alternative method listed in subdivision H.

In addition, a throughput limit condition (C1.8) is added to this construction permit to establish the NSR baseline.

There are no changes to the process, thus, no emission increases are expected for the proposed change of conditions.



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Appl. No. 511295 was submitted as an expedited class-I application to change the RTO RECLAIM NOx emission limit from 30 ppmv @ 3% O₂ to 1) 130 lb/mm scf (default value) for the operation of start-up burner mode, and 2) 1 ppmv as stack gas concentration limit for the operation of natural gas injection mode.

The RTO is operated under a start-up burner mode or a natural gas injection mode. The RTO currently is required to meet with 30 ppmv @ 3% O₂ limit with no differentiation between the two modes. Based on a test performed on April 10, 2002, Dart concluded that this RTO cannot meet with the 30 ppmv @ 3% O₂ limit with the operation of the start-burner mode, and the NOx emissions are well below the 30 ppm limit with the operation of natural gas injection mode. Therefore, the applicant proposed two different operation mode-specific reporting limits, as indicated as follows:

- Default fuel meter-based emission factor (130 lb/mm scf) for the RTO burner mode. The RTO burner mode is only used during the start-up of the RTO to preheat the chamber to 1,450 °F. Once the chamber temperature reaches 1,450 °F, the process air is allowed to enter the RTO and the natural gas injection mode will be switched on to replace the burner mode. The burner mode is rarely used because the RTO only shuts down once or twice a year for the required maintenances. The burner mode is expected to be operated less than 5% of the RTO operation time.
- 1 ppmv stack concentration limit for the RTO natural gas injection mode. The stack concentration limit will require a continuous flue gas monitoring system for the RECLAIM NOx emission reporting purpose. The facility already submitted a continuous flue gas monitoring system certification application according to the source test engineer, Mr. Scott Wilson.

Appl. No. 511294 was submitted on November 1, 2005, as a plan for the minor revision of the Title-V/Reclaim permit as specified in Rule 301.

PROCESS DESCRIPTION

APPL. NO. 511293 – PROCESS 10 SYSTEM 1 - OPS PROCESSING

Polystyrene pellets are fed into the extruder (D226), where they are melted and extruded through a sheet die. The sheet then passes through a machine direction orientation step. From there the sheet is forwarded to a natural gas heated oven (D227) and a tenter frame that stretches the extruded sheet in the other direction. This oven is operated under 550 °F (Condition no. C6.1). After the sheet is orientated, it exits the oven and is cooled, trimmed, and rolled. The rolls of finished sheet are then set aside until needed in thermoforming.

When product is required, the sheet is sent to the thermoformers (D229), where the sheet is unrolled and then transported through an electric oven, which heats the sheet to its softening point. The softened sheet is stamped into the desired shape and taken to the trim press where the individual parts are cut out. The trim scrap is ground and then sent either directly to the repelletizing line (Process 10, System 2), or to a storage bin (D237) to await pelletization. The product is packaged and sent to the warehouse to await delivery to customers. Trim scrap is ground for reuse in the DI foam extrusion process.



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Source test for the oven D227

The facility performed a NOx emission compliance test on June 6, 2005, and the test results indicated O₂ concentration of 20.6% and CO₂ concentration of 0.15%. Thus, the dry F factor approach, which requires O₂ level less than 19% or CO₂ level greater than 1%, cannot be used to demonstrate this oven is operating in compliance with the NOx emission concentration limit of 30ppmv @ 3% O₂.

Emissions

VOC emission points and control equipment:

Emission Equipment	Emission Type and Path	APC System	
		Emission Collection Method	Control Equipment
Extruder D226	Polystyrene sheet forming	Not collected	Uncontrolled

PM10 emission points and control equipment:

Emission Equipment	Emission Type and Path	APC System	
		Emission Collection Method	Control Equipment
Extruder D226	Extruder die – hot and molten polystyrene	Forced draft hood located over the extruder	ESP, C244

Combustion emissions and control method:

Emission Equipment	Emission Type and Path	Emission Control Method
Oven D227	Burner	N/A

APPL. NO. 511295 – RTO (C224)

The oxidizer is a thermal regenerative unit made by Smith Environmental and equipped with an 8 MM Btu/hr natural gas fired start-up burner, a natural gas injection system (7 MMBtu/hr), a 15-HP combustion air blower, and two canisters of heat transfer media. Each canister has two valves, one that connects it to the inlet manifold, and one that connects it to the exhaust manifold. A 250-HP blower provides an induced draft on the oxidizer and exhausts it to atmosphere through a 46-inch diameter stack. The blower is equipped with a static pressure controller to automatically maintain a negative draft on the process equipment. The oxidizer operates at a minimum of 1450°F. The oxidizer design incorporates the two heat exchanger beds connected at the top to the combustion chamber and at the bottom to the inlet and outlet manifolds through a flow reversal valve mechanism. Natural gas is injected at the oxidizer inlet whenever the heat of combustion from the isopentane in the flue gas is insufficient to maintain the temperature set point of the combustion chamber. Flow reversals at about 2 to 4-minute intervals preserve heat and promote thermal efficiency.

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CALCULATIONS

This facility operates 24 hrs/day, 7 days/wk, and 52 wks/yr.

APPL. NO. 511293 – OPS PROCESSING LINE 1

There are no changes to the process, thus, no emission increases are expected for the proposed change of conditions. The following calculations are performed to update the NSR database.

PM10 and VOC Emissions from the extruder (D226)

Operation Schedule:

24 hrs/day (max.), 7 days/wk, 52 wks/yr

Extruder (D226) process rate = 5,400 lb/hr, or 64.8 tons/day

Emission Factors

Product/Process	Pollutants	Emission Factor
		(lb/ton plastic)
Plastic Extruder ¹	PM	0.0958
	VOC	0.0706

Note:

1. Emission Factors were obtained from an Emission Calculation Fact Sheet from Michigan Department of Environmental Quality (FACT SHEET #9847, Rev 11/05).

Assumptions:

PM10 = PM

Force draft hood collection efficiency = 90%

ESP (C244) collection efficiency = 75%

PM10 emissions from D226:

$R1 = (5,400 \text{ lb/hr}) (0.0958 \text{ lb/ton}) / (2,000 \text{ lb/ton}) = 0.259 \text{ lb/hr}$, or 6.21 lb/day

$R2 = (0.259 \text{ lb/hr}) [(1-90\%) + (90\%)(1-75\%)] = 0.08418 \text{ lb/hr}$, or 2.02 lb/day

VOC emissions from D226:

$R1=R2 = (5,400 \text{ lb/hr}) (0.0706 \text{ lb/ton}) / (2,000 \text{ lb/ton}) = 0.1906 \text{ lb/hr}$, or 4.57 lb/day

Combustion Emissions from the oven (D227)

This oven is natural gas fired at a rate of 4.2 MMBtu/hr, and it is used to keep OPS sheet temperature at 220 to 320 deg. F to allow orientation of the polystyrene molecules.

Emission Factors



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$$\text{Emission}_{\text{ROG, SOX, PM10}} \text{ (lb/MMBtu)} = EF_{\text{ROG, SOX, PM10}} \left(\frac{\text{lb}}{\text{MMscf}} \right) \times \frac{1\text{MMscf}}{1050\text{MMBtu}}$$

Emission Factor Summary - Natural Gas

Pollutant	Emission Factor (AQMD Default) lb/mmscf	Emission Factor (for this report) lb/MMBtu
VOC	7	0.00667
SOx	0.6	0.000571
PM10	7.5	0.00714
NOx	Not Applicable - Will be monitored under the RECLAIM Program	
CO	35	0.03333

AQMD Default emission factors were taken from “General Instruction Book for the AQMD 2007-2008 Annual Emission Reporting Program”, Appendix A- Table 1):

Burner rating: 4.2 MMBTU/hr

Operating Schedule: 24 hrs/day; 7 days/week; 52 weeks/yr

The calculated emission results are indicated below:

Oven (D227) Combustion Emission Summary

		Hourly (lbs/hr)	Daily (lbs/day)	Annually (lbs/yr)	30 day ave. (lbs/day)	30 day NSR (lbs/day)
R1=R2	VOC	0.028	0.67	244.7	0.67	1
R1=R2	SOx	0.002	0.06	21.0	0.06	0
R1=R2	PM10	0.030	0.72	262.0	0.72	1
R1=R2	CO	0.140	3.36	1222.9	3.36	3

Emission Summary:

PM10 emissions:

$$R1 = R1_{\text{Extruder D226}} + R1_{\text{Oven D227}} = 0.259 \text{ lb/hr} + 0.03 \text{ lb/hr} = 0.289 \text{ lb/hr, or } 6.94 \text{ lb/day}$$

$$R2 = R2_{\text{Extruder D226}} + R2_{\text{Oven D227}} = 0.08418 \text{ lb/hr} + 0.03 \text{ lb/hr} = 0.114 \text{ lb/hr, or } 2.736 \text{ lb/day}$$

VOC emissions:

$$R1=R2 = (R1=R2)_{\text{Extruder D226}} + (R1=R2)_{\text{Oven D227}} = 0.1906 \text{ lb/hr} + 0.028 \text{ lb/hr} = 0.2186 \text{ lb/hr, or } 5.25 \text{ lb/day}$$



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A/N 511293		Hourly (lbs/hr)	Daily (lbs/day)	Annually (lbs/yr)	30 day ave. (lbs/day)	30day NSR (lbs/day)
VOC	R1=R2	0.22	5.25	1,909.69	5.25	5
SOx	R1=R2	0.00	0.05	17.47	0.05	0
PM10	R1	0.29	6.94	2,524.70	6.94	7
	R2	0.11	2.74	995.90	2.74	3
CO	R1=R2	0.14	3.36	1,223.04	3.36	3

ALTERNATIVE COMPLIANCE NOx EMISSION LIMIT CALCULATION:

The NOx emission limit for the oven D227 will be converted using the following equation:

$$R_c = ppmv_{O_2} [20.9 / (20.9 - b)] \times 1.195 \times 10^{-7} \times F_d \times V$$

Where:

- R_c = Emission rate converted from the Facility Permit concentration, lb/mmscf
- ppmv = Facility Permit NOx concentration limit = 30 ppmv @ 3% O₂
- b = 3
- F_d = Natural Gas F-factor = 8,710 dscf/mmBtu @ 68°F and 29.92 in Hg
- V = the higher heating value of natural gas = 1,050 mmBtu/mmscf

$$R_c = 30 \times [(20.9 / (20.9 - 3))] \times 1.195 \times 10^{-7} \times 8,710 \times 1,050 = 38.28 \text{ lb/mmscf}$$

APPL. NO. 511295 – RTO (C224)

Combustion Emissions

RTO, C224, (Main burner and fuel injection)

Emission Factors

Same emission factors from the tenter frame oven D227 will be used to apply RTO C224.

Burner rating: 8 MMBTU/hr

Operating Schedule: 24 hrs/day; 7 days/week; 52 weeks/yr

RTO (C224) Combustion Emission Summary

A/N 511295		Hourly (lbs/hr)	Daily (lbs/day)	Annually (lbs/yr)	30 day ave. (lbs/day)	30 day NSR (lbs/day)
R1=R2	VOC	0.053	1.28	466.2	1.28	1
R1=R2	SOx	0.005	0.11	39.9	0.11	0
R1=R2	PM10	0.057	1.37	499.0	1.37	1
R1=R2	CO	0.267	6.40	2329.4	6.40	6



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Pre Change-of-Condition:

The RTO NOx emissions under current emission limit will be calculated using the following equation:

$$E = ppmv_{O_2} [20.9 / (20.9 - b)] \times 1.195 \times 10^{-7} \times F_d \times Rating$$

Where:

E = NOx emissions lb/hr

ppmv = NOx concentration = 30 ppmv @ 3% O₂

b = 3

F_d = Natural Gas F-factor = 8,710 dscf/MMBtu @ 68°F and 29.92 in Hg

Rating = 8 MMBtu/hr

R1 = R2 = 0.292 lb/hr, or 7.01 lb/day

Post Change-of-Condition:

Fuel Injection Mode

The NOx emissions for the natural gas injection mode will be calculated using the following equation:

$$E = ppmv_{ST} \times 1.195 \times 10^{-7} \times F$$

Where:

E = NOx emissions lb/hr

ppmv = NOx stack concentration = 1 ppmv (Condition no. A99.2)

F = RTO stack flow rate (Max.) = 35,000 scfm = 2,100,000 scf/hr

E = 0.251 lb/hr

Start-up Burner Mode

The NOx emissions for the start-up burner mode will be calculated using the following equation:

$$E = EF_{NOx} \left(\frac{lb}{MMscf} \right) \times \frac{1MMscf}{1050MMBtu} \times Rating$$

Where:

E = NOx emissions lb/hr

EF_{NOx} = NOx emission factor = 130 lb/MMscf (Condition no. A99.1)

Rating = 8 MMBtu/hr

E = 0.99 lb/hr

Post Change-of-Condition NOx PTE calculation:

The start-up burner mode will be used less than 5% of RTO operation time; thus,

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 $R1=R2 = 95\% \times (0.251 \text{ lb/hr}) + 5\% \times (0.99 \text{ lb/hr}) = 0.288 \text{ lb/hr, or } 6.91 \text{ lb/day}$

PTE decrease!

Conclusion

Based on the calculation shown above, the new emission limits are more restrictive than the previous limit.

RULES AND REGULATIONS EVALUATION

Rule 212: **Standards for Approving Permits** – The facility is not located within 1,000 feet of a K-12 school, and there are no emission potential increases with the proposed change of conditions. A Public Notice is not required.

Rule 401: **Visible Emissions** – Compliance is expected from well maintained and properly operated equipment.

Rule 402: **Public Nuisance** – With proper operation and maintenance, the equipment are not likely to create a public nuisance.

Rule 407: **Liquid and Gaseous Air Contaminants:** The rule allows a CO concentration of 2,000ppm in the gas discharge to the atmosphere.

APPLICATION NO. 511293 – OVEN (D227)

A source test conducted on June 6, 2005 indicated that this oven was operating at 15.5 ppmv @ 3% O₂. However, since this source test report was never submitted to District for approval, a new source test will be conducted to demonstrate compliance with this rule.

Rule 1147: **NO_x Reductions from Miscellaneous Sources**

APPL. NO. 511293 – OVEN (D227)

The oven is a “Process Unit” under RECLAIM program and it is exempted from this rule per section (g)(1)(B).

APPL. NO. 511295 – RTO (C224)

The RTO is a “Process Unit” under RECLAIM program and it is exempted from this rule per section (g)(1)(B).

REG XIII: **New Source Review** - There are no emission potential increases with the change of condition applications. No emission offset is required for these applications.

Rule 2005: **New Source Review for RECLAIM**

APPL. NO. 511293 – OVEN (D227)

Condition No. D28.1 requires one compliance test on the oven (D227) for every 5-years period for the NO_x concentration limit (30 ppmV @ 3% O₂ for BACT and RECLAIM reporting limit) and CO concentration limit (2000 ppmV @ 3% O₂ for Rule 407). The



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applicant supplied a source test report prepared by Professional Environmental Services, Inc. The source test was conducted on June 6, 2005, and the results indicated a NOx concentration of 10.74 ppmV and a CO concentration of 15.5 ppmV @ 3% O₂ for the normal operation.

However, since this source test report was never submitted to District for approval, a new source test will be conducted to show the compliance with this rule.

APPL. NO. 511295 – RTO (C224)

The new NOx concentration limit (1 ppmv at exhaust stack) is considered as BACT limit for the RTO. Dart performed the source test on April 10, 2002 as required by Condition no. 28-3. The source test results indicated a NOx concentration at the stack was 0.12 ppmv. However, since this report was submitted for the evaluation of Rule 1175 VOC compliance verification, the District M&STE did not provide a conclusion for the NOx emissions in their memorandum dated July 31, 2002 (ref. 01326). Therefore, a new source test will be conducted to show the compliance with this concentration limit.

Rule 2012: Requirements for Monitoring, Reporting, and Recordkeeping for Oxides of Nitrogen (NOx) Emissions

APPL. NO. 511293 – OVEN (D227)

APPENDIX A, CHAPTER 5, SUBDIVISION H, SECTION 2

To approve this alternative method to be used, this section requires the Facility Permit holder demonstrates that the oven (D227) meets all of the following requirements:

- a. O₂ and CO₂ contents in the exhaust - The source test conducted on June 6, 2005 indicated O₂ concentration of 20.6% and CO₂ concentration of 0.15% O₂. This meets the requirements of O₂ concentration greater than or equal to 19% and CO₂ concentration below 1%.
- b. Source test conditions will be added to ensure compliance of this section.
- c. The oven is using natural gas only. Compliance is expected.
- d. The oven has only one emission stack. Compliance achieved.
- e. The oven is operated under 550 °F (Condition no. C6.1); thus, no products of combustion other than natural gas are expected. Compliance is achieved.

Reg XXX: Title V Permit

Dart Container Corp of California (Facility ID: 3721) has an active Title V permit. Based on the above evaluation, no PTE increase is expected for the change of condition applications. In addition, the new emission limits are equally or more restrictive than the previous limits. Therefore, application no. 511294 is considered as Minor Permit Revision of Title V Facility Permit and it is subject to a 45-day EPA review prior to final revision of the Title V Facility Permit (Application No. 511294).



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CONCLUSION AND RECOMMENDATIONS

Based on this evaluation, it is expected that the subject equipment will be operated in compliance with all applicable District Rules and Regulations. The permits to construct are recommended to be issued.