



ENGINEERING AND COMPLIANCE

APPLICATION PROCESSING AND CALCULATIONS

APPL. NO.

411091 & 491853

DATE:

01/30/09

PROCESSED BY

S. JIANG

CHECKED BY

D. GORDON

EVALUATION REPORT FOR PERMIT TO OPERATE

Applicant's Name: PACTIV CORP

Facility ID: 21474

Mailing Address: 15221 CANARY AVENUE
LA MIRADA, CALIFORNIA 90638

Equipment Location: SAME

Modifications are shown in bold italic, original in bold strike-through.

APPLICATION NO. 411091 – Existing Modification of Reclaim Extruder R-200 (PO F15850 A/N: 333274)

MODIFICATION OF EXISTING POLYSTYRENE EXTRUSION RECLAIM LINES (PROCESS 1) RECLAIM EXTRUDER R-200 (SYSTEM 2) BY:

THE ADDITION OF:

- **Pneumatic Conveyor, 5 H.P. Blower (D90)**
- **A 100 lb cyclone receiver (D87)**
- **A 100 lb weighing hopper (D88)**
- **A 400 lb surge hopper (D89)**
- **Pneumatic Conveyor, 10 H.P. Blower (D91)**

Equipment	ID No.	Connected to	RECLAIM Source Type/ Monitoring Unit	Emission and Requirements	Conditions
Process 1: Polystyrene Extrusion Reclaim Lines					<i>PI.2</i>
System 2: Extruder, Reclaim, R-200					
EXTRUDER, R-200, NRM., WITH 18 ELECTRICAL HEATERS, 180 KW A/N: 333274 411091	D8	D12 C60		PM: (9) [RULE 405, 2-7-1996]; VOC: (9) [RULE 1175, 5-13-1994]; [RULE 1175, 9-7-2007]	M333.1
HOPPER, SURGE, 1400 LBS CAPACITY A/N: 333274 411091	D9	C10		PM: (9) [RULE 405, 2-7-1996]	D323.1
FILTER, MIKRO-PUL, MODEL 64S8, WITH FABRIC FILTER, WIDTH: 5FT 6IN; LENGTH: 5FT 6IN; 9,425 SQ.FT.; HEIGHT: 7FT 9IN A/N: 333274 411091	C10	D9 C55		PM: (9) [RULE 405, 2-7-1996]; VOC: (9) [RULE 1175, 5-13-1994]	D322.1, E102.1, K67.2
PELLETIZER, WATER RING, 6.5-H.P. A/N: 333274 411091	D11	D12		PM: (9) [RULE 405, 2-7-1996]; VOC: (9) [RULE 1175, 5-13-1994]; [RULE 1175, 9-7-2007]	
SCREEN, CLASSIFYING, VIBRATING, 1-H.P. A/N: 333274 411091	D12			PM: (9) [RULE 405, 2-7-1996]; VOC: (9) [RULE 1175, 5-13-1994]; [RULE 1175, 9-7-2007]	
CONVEYOR, PNEUMATIC, POLYSTYRENE PELLETS, WITH A 5	D90 (NEW)				

**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT****ENGINEERING AND COMPLIANCE****APPLICATION PROCESSING AND CALCULATIONS**

APPL. NO.

411091 & 491853

DATE:

01/30/09

PROCESSED BY

S. JIANG

CHECKED BY

D. GORDON

H.P. BLOWER A/N: 411091					
HOPPER, SURGE, CYCLONE, 100 LB CAPACITY. A/N: 411091	D87 (NEW)			PM: (9) [RULE 405, 2-7-1996]	
HOPPER, WEIGHING, 100 LB CAPACITY. A/N: 411091	D88 (NEW)			PM: (9) [RULE 405, 2-7-1996]	
HOPPER, SURGE, 400 LB CAPACITY. A/N: 411091	D89 (NEW)			PM: (9) [RULE 405, 2-7-1996]	
CONVEYOR, PNEUMATIC, POLYSTYRENE PELLETS, WITH A 10 H.P. BLOWER A/N: 411091	D91 (NEW)				

APPLICATION NO. 491853: MINOR TITLE V FACILITY PERMIT REVISION

REVISION OF TITLE V FACILITY PERMIT DUE TO PERMIT MODIFICATIONS PER RULE 301(1)(7).

PERMIT CONDITIONS

The following conditions are added:

P1.2 The operator shall limit the production rate to no more than 876 ton(s) in any one calendar month.

For the purpose of this condition, products 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)(1)-Offset, 5-10-1996; RULE 1303(b)(1)-Offset, 12-6-2002]

[Processes subject to this condition: 1]

BACKGROUND/HISTORY

Pactiv Corp (Pactiv) La Mirada facility manufactures disposable polystyrene foam food service products such as plates, containers, and bowls. Pactiv La Mirada facility is a Title V facility but not RECLAIM.

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 was submitted on September 27, 2005, and the proposed renewal permit will be submitted to EPA for review simultaneously with the subject applications.



ENGINEERING AND COMPLIANCE

APPLICATION PROCESSING AND CALCULATIONS

APPL. NO. 411091 & 491853	DATE: 01/30/09
PROCESSED BY S. JIANG	CHECKED BY D. GORDON

On January 22, 2003 and October 28, 2008, Pactiv submitted the following applications:

<u>A/N</u>	<u>Type</u>	<u>Previous Permit No.</u>	<u>Equipment</u>
491853	Plan	N/A	Minor Title V Permit Revision
411091	PO no PC -Modification	F15443 (A/N 333274)	Polystyrene Extrusion reclaim Line R-200

The proposed modification will allow Pactiv to weigh the reclaim polystyrene pellets prior to discharge to the silo.

PROCESS DESCRIPTION

The Pactiv La Mirada facility takes virgin and reclaimed polystyrene pellets to make commercial-use polystyrene foam packaging containers. Polystyrene pellets are taken from storage silos and are fed with a blowing agent, butane (normal or iso-), to two process lines. Each line consists of an extruder that processes the resin pellets into sheets of polystyrene foam. Emissions from the extruders are vented to a regenerative thermal oxidizer (RTO) for volatile organic compound (VOC) control.

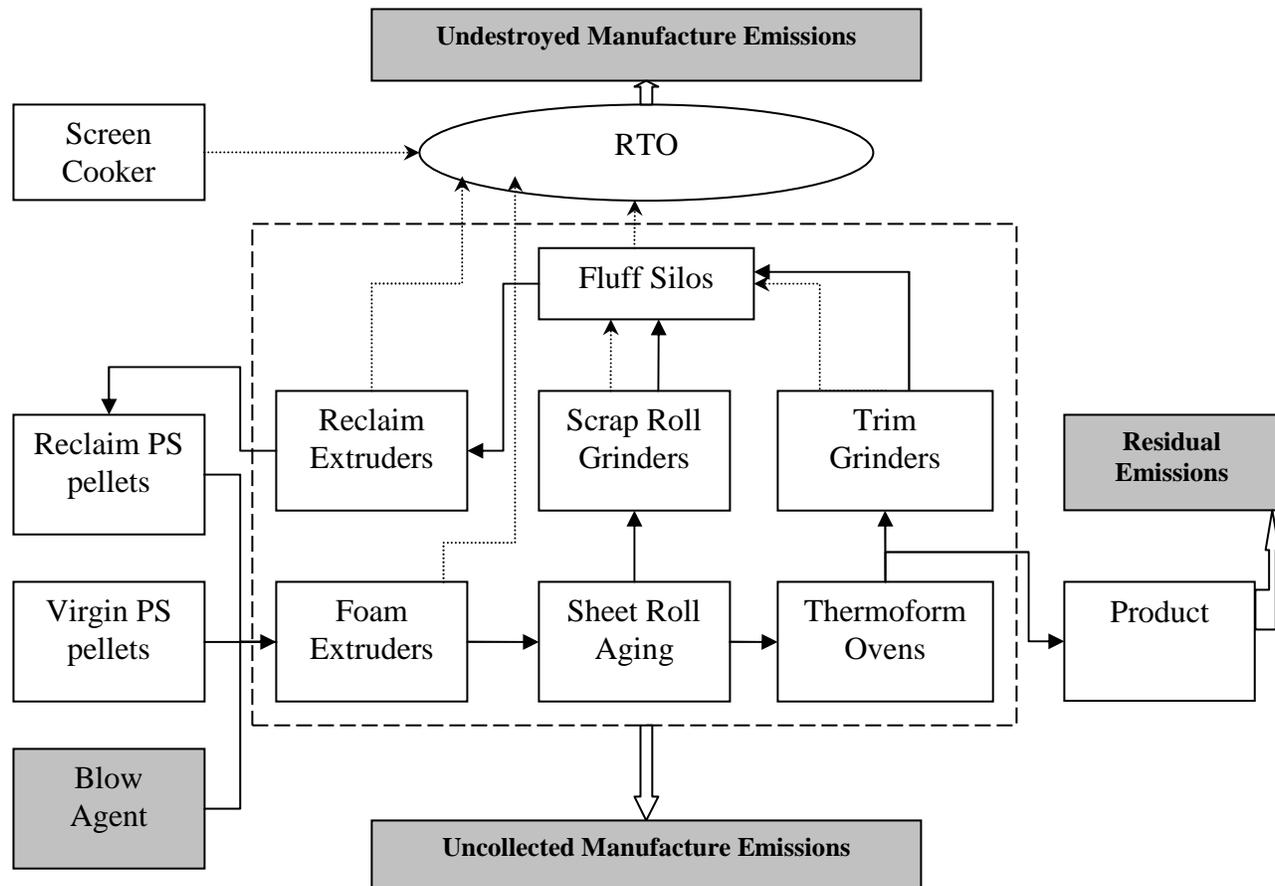
From the extruders, the polystyrene sheets are laminated. The laminated sheet then goes to a winder where it is rolled up. The rolled up sheets are then placed in storage to age. After aging, any flawed sheets are removed and sent to scrap bulk grinders. The ground flakes are then sent to the fluff silos. The VOC emissions from the bulk grinders are vented to the fluff silos equipped with filters and then vented to the RTO.

The unblemished polystyrene foam sheets are fed to thermoform ovens to produce foam containers. After the thermoforming step, the excess foam materials at the edges of the containers are cut out (scraps) and removed from the product and fall into a granulating system of underpress grinders positioned below the thermoform ovens. The scraps are then ground into flakes and conveyed to the fluff silo equipped with filters which are in turn vented to the RTO.

Flakes in the fluff silos are fed into one of two reclaim resin extruders and palletizing systems. Flakes are sent to a surge hopper which equipped with filters and then the exhaust conveying air is vented to the RTO. The reclaim extruders are vented to electrostatic precipitators and then to the RTO. Reclaimed pellets are weighed and transferred into a reclaimed resin silo.



The process flow, VOC emissions and the RTO emission controls are shown in the following diagram:



Note: this diagram did not include the PM10 emissions that are controlled by the ESP's and/or filters.

Rule 1175 Compliance Issues

On August 5, 2005, the District issued a Notice of Violation (P46071) to Pactiv for failure to demonstrate compliance with facility permit condition number F2.1, which limits VOC emissions from the facility to be less than 2.4 lbs per 100 lbs of raw material processed (R1175(c)(2)). The NOV was issued based on a source test performed on March 2, 2004. The calculation for the compliance of R1175 at the time was based on a believing of that the "raw material" should not include the reclaim polystyrene pellets and the polystyrene laminate.

On September 7, 2005, Pactiv submitted a petition for variance (case no. 5551-1) from the NOV. The petition was filed because "Pactiv disagrees with the District's determination and was not aware that the District would issue a NOV until it was served". In the petition, Pactiv sought a variance until either the District changes its position or the District explains in sufficient detail how the facility can run a compliant facility and test as a compliant facility. The hearing was scheduled on December 1, 2005, and was subsequently rescheduled two times to February 9, 2006.

**ENGINEERING AND COMPLIANCE****APPLICATION PROCESSING AND CALCULATIONS**

APPL. NO. 411091 & 491853	DATE: 01/30/09
PROCESSED BY S. JIANG	CHECKED BY D. GORDON

On February 3, 2006, John Olvera of District Counsel issued a memo concerning the definition of “raw material” in Rule 1175. In this memo John concluded the definition of “raw materials” does not specifically exclude recycled polystyrene beads from its meaning”. In addition, John recommended that the Rule be amended to clarify the definition of “raw material,” as well as other related provisions, such as Rule 1175(c)(2) in order to facilitate the enforcement of Rule 1175. Based on the District Counsel’s conclusion, the previous compliance calculation had to be revised and the facility compliance status had to be re-evaluated. (Meanwhile, a second controversy over the applicability of Rule 1175(c)(2) to the polystyrene foam extrusion operations was raised, despite of the Pactiv’s permit shield condition no. M333.1, which provides Pactiv a permit shield from Rule 1175(c)(4). The controversy focused on whether the definition of “expandable polystyrene molding operation” should include the polystyrene foam thermoform operation, such as Pactiv’s operation.)

Since then,

- February 7, 2006 Pactiv withdrew the petition for variance (case no. 5551-1) because the NOV (P46071) had been voided for no violation basis.
- March 10, 2006 M&STE issued the third evaluation report (reference no. 04243C) for the source test performed on March 2, 2004. M&STE deemed the Pactiv is in compliance with the limit of Rule 1175(c)(2) if and only if the recycled polystyrene is considered raw material, and *“compliance can be assured on an ongoing basis if the mass of VOC is required to be periodically measured, recorded, and calibrated and if the weights of the rolls from the extruder line are also measured, recorded, and calibrated periodically”*.
- July 12, 2007 Pactiv had another Rule 1175 compliance source test performed as required under the permit condition no. D28.1. D28.1 requires Pactiv conduct a compliance test once every three years.
- September 7, 2007 Rule 1175 was amended. However, it neither made the clarification of “the definition of “raw material,” as well as other related provisions, such as Rule 1175(c)(2)” as recommended by John Olvera of the District Counsel, nor did it clarified the differences between “expandable polystyrene molding operation” and “polystyrene foam thermoform operation”.
- May 20, 2008 Mr. Mohsen Nazemi, DEO of Engineering & Compliance, issued a Rule Implementation Guidance, Rule 1175 – Control of Emissions from the Manufacturing of Polymeric Cellular (Foam) Products. In the Guidance, Mohsen concluded Rule 1175(c)(2) is applicable to polystyrene foam extrusion manufacturing operations.
- October 17, 2008 M&STE approved the report (reference no. 07028 REVISED) for the source test performed on July 12, 2007. M&STE deemed the source test results demonstrated that Pactiv is in compliance with R1175(c)(2) only during times that the process uses raw materials that have a VOC content not to exceed 2.24 lb VOC/100 lb of raw material.



ENGINEERING AND COMPLIANCE

APPLICATION PROCESSING AND CALCULATIONS

APPL. NO. 411091 & 491853	DATE: 01/30/09
PROCESSED BY S. JIANG	CHECKED BY D. GORDON

Emissions:

VOC and PM10 emissions are expected from flake conveying and reclaim extrusion processes. The blowing agent, butane, which trapped in the cells of the polystyrene foam, will be released during pneumatic conveying process (caused by flake collision) and when the foam flakes melt in the extruder. PM (dust), which was formerly generated during the grinding process and then collected in the flake storage silos, will be released due to pneumatic conveying from the silos to the extruder. In addition, PM (mist) will be generated during reclaim extrusion process.

The conveying air entrained with PM (dust) and VOC's is routed through the filter (C10) where the dust is collected, then to the RTO (C55) where the VOC's are destroyed. The PM (mist) and VOC emissions from the reclaim extruder D8 are captured through a use of a collection hood located above the extruder die and through an extruder vent point (enclosed), then rout through an ESP (C60) where the mist is collected, and then to the RTO (C55) where the VOC's are destroyed.

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

EMISSION CALCULATIONS

The polystyrene pellets are spherical shapes and have an average aerodynamic diameter of 4.1 mm. The polystyrene pellets will not break during pneumatic conveying process. **Therefore, there are no PM10 emissions expected from the weighing hopper and associated pneumatic conveying devices, and no emission change for the existing modification of the Reclaim Polystyrene Extrusion Line R-200.**

VOC emissions:

Reclaim Polystyrene Extrusion Line R-200 is a part of Polystyrene Foam Product Manufacturing Operation, which is subject to Rule 1175. The entire Polystyrene Foam Product Manufacturing Operation will be source tested once every three years (Condition No. D29.1).

PM10 emissions due to pneumatic conveying:

Emission Factor = 5.34×10^{-4} lb PM₁₀/lb flake (Developed by Pactiv through extensive testing at their facility. This emission factor is to remain confidential and is proprietary for their operations.)

Pneumatic Conveyor filter (C10) control efficiency = 99%

Condition no. P1.2 limits a production rate of 876 tons/month for the two reclaim extruders (R-100 and R-200). Assume 50% of this material throughput will be processed in R-200, the maximum throughput for the reclaim extruder R-200 is 438 tons/month, or 29,200 lbs/day, or 1,216.67 lbs/hr.

$$R1 = R2 = (1 - 99\%) (1,216.67 \text{ lbs/hr}) (5.34 \times 10^{-4} \text{ lb /lb}) = 0.00650 \text{ lb/hr or } 0.156 \text{ lb/day}$$



ENGINEERING AND COMPLIANCE

APPLICATION PROCESSING AND CALCULATIONS

APPL. NO.

411091 & 491853

DATE:

01/30/09

PROCESSED BY

S. JIANG

CHECKED BY

D. GORDON

PM10 emissions due to polystyrene flakes extrusion (Reclaim Process):

Assumptions:

80% collection efficiency for the ESP C60 (from die hood and the extruder vent)

99% capture efficiency (based on the fact of that the exhaust from ESP C60 is vented to the RTO C55)

PM Emission Factor for Extruder: 0.0958 lbs/ton plastic¹

PM₁₀ = PM

Note:

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

PM10 emissions due to extrusion:

R1 = (1,216.67 lbs/hr) (0.0958 lb/ton Product) / (2,000 lbs/ton) = 0.0583 lb/hr

R2 = (0.0583 lb/hr) (1 – 80%) + (0.0583 lb/hr) (80%) (1 – 99%) = 0.0121 lb/hr

Total PM10 emissions

R1 = (0.00650 lb/hr) + (0.0583 lb/hr) = 0.0648 lb/hr

R2 = (0.00650 lb/hr) + (0.0121 lb/hr) = 0.0186 lb/hr

EMMISSION SUMMARY

The calculated PM10 emission results and the VOC PTE's obtained from the NSR database are indicated below:

Extruder R-200		HOURLY (lbs/hr)	DAILY (lbs/day)	30DAY AVE. (lbs/day)	30 DAY NSR (lbs/day)	ANNUAL AVE. (lbs/yr)
R1	VOC	56.64	1359.36	1359.36	1,359	494,807
R2	VOC	12.28	294.72	294.72	295	107,278
R1	PM10	0.0648	1.56	1.56	2	566
R2	PM10	0.0186	0.45	0.45	0	162

Daily (lbs/day) = (Hourly, lbs/hr) (24 hr/day)

Annually (lbs/yr) = (daily, lbs/hr) (7 day/wk) (52 wk/yr)

30-day average = (Daily, lbs/day)

RULES AND REGULATIONS EVALUATION

Rule 212: **Standards for Approving Permits** – The facility is not located within 1,000 feet of a K-12 school (A location map can be viewed in Appendix A), and there is no emission increase with this modification. A Public Notice is not required.

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

**ENGINEERING AND COMPLIANCE****APPLICATION PROCESSING AND CALCULATIONS**

APPL. NO. 411091 & 491853	DATE: 01/30/09
PROCESSED BY S. JIANG	CHECKED BY D. GORDON

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

Rule 1175: **Control of Emissions from the Manufacture of Polymeric Cellular (Foam) Products**
On October 17, 2008, M&STE approved the report (reference no. 07028 REVISED) for the source test performed on July 12, 2007. M&STE deemed the source test results demonstrated that Pactiv is in compliance with R1175(c)(2). In addition, Condition No. D29.1 is added to ensure future compliance with this rule.

REG XIII: **New Source Review** - There are no emission increase associated with proposed change of conditions. No emission offset is required for this application.

Rule 1401: There is no toxic air contaminant associated with this application. Risk assessment is not required.

Reg XXX: **Title V Permit**
Pactiv Corp (Facility ID: 021474) has an active Title V permit. Based on the above evaluation, the proposed equipment modification will not result in an increase in emission of any criteria air pollutant or any air toxic contaminant. The Proposed modification (Application No. 411091) is therefore considered a Minor Permit Revision of Pactiv's Title V Facility Permit and it is subject to a 45-day EPA review prior to final revision of the Title V Facility Permit.

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 Permit to Operate is recommended to be issued.