



ENGINEERING AND COMPLIANCE

APPLICATION PROCESSING AND CALCULATIONS

APPL. NO.	DATE:
511762 & 511763	December 16, 2010
PROCESSED BY	CHECKED BY
S. JIANG	D. GORDON

EVALUATION REPORT FOR PERMIT TO CONSTRUCT

Applicant's Name: FREE FLOW PACKAGING INTERNATIONAL, INC. Facility ID: 43605

Mailing Address: 1090 MILLS WAY REDWOOD CITY, CA 94063

Equipment Location: 6195 E. RANDOLPH STREET CITY OF COMMERCE, CA 90040 - 3513

EQUIPMENT DESCRIPTION

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

Appl. No. 511762 – Modification of Air Pollution Control System (P/O F5025)

Modification of existing Air Pollution Control System, by:

the addition of:

- Permanent Total Enclosures to the exhaust system

AIR POLLUTION CONTROL SYSTEM CONSISTING OF:

1. REGENERATIVE THERMAL OXIDIZER, SMITH ENGINEERING CO., *MODEL NO. E1972, 9'-6"W X 29'-7"L X 12'-8"H, WITH A BURNER, MAXON CORPORATION, MODEL NO. 3" SERIES G KINEMAX, 2,400,000 BTU/HR ~~MAXIMUM RATING~~, NATURAL GAS FIRED, 9'-6"W X 29'-7"L X 12'-8"H, ~~OVERALL DIMENSIONS~~ WITH A 10-HP COMBUSTION AIR BLOWER AND TWO HEAT EXCHANGER BEDS, EACH PACKED WITH 15,000 POUNDS OF CERAMIC SADDLES, ~~AND A FLOW REVERSAL VALVE.~~*
2. *PERMANENT TOTAL ENCLOSURE, EXTRUSION ROOM, ENCLOSING TWO EXTRUDERS, TWO FIRST EXPANDERS, ONE SECOND EXPANDER AND ONE PROCESS SCRAP GRINDER.*
3. *PERMANENT TOTAL ENCLOSURE, INTERMEDIATE STORAGE ROOM, ENCLOSING 12 INTERMEDIATE HOPPERS, COMMON WITH POLYSTYRENE FOAM PACKAGING MATERIAL MANUFACTURING SYSTEM.*
4. *PERMANENT TOTAL ENCLOSURE, DRYING ROOM, ENCLOSING SIX HOLDING BINS, COMMON WITH POLYSTYRENE FOAM PACKAGING MATERIAL MANUFACTURING SYSTEM.*
5. *PERMANENT TOTAL ENCLOSURE, STORAGE ROOM I, ENCLOSING ONE CHIP BREAK BAG, TEN STORAGE SILOS AND TWO TRANSFER CHUTE BAGS, COMMON WITH POLYSTYRENE FOAM PACKAGING MATERIAL MANUFACTURING SYSTEM.*
6. *PERMANENT TOTAL ENCLOSURE, STORAGE ROOM II, ENCLOSING ONE CHIP BREAK BAG, FIVE STORAGE SILOS AND ONE TRANSFER CHUTE BAG, COMMON WITH POLYSTYRENE FOAM PACKAGING MATERIAL MANUFACTURING SYSTEM.*



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7. EXHAUST ~~SYSTEM FAN~~ WITH ONE 60-~~BHP~~ *MAIN* BLOWER, *ONE 15-HP AND ONE 5-HP BOOSTER BLOWERS* VENTING ~~TWO EXTRUDERS, FIVE EXPANDERS, A DRYING ROOM, AND TWO INTERMEDIATE AND FINAL PRODUCT STORAGE AREAS OF THE POLYSTYRENE LOOSEFILL PROCESSES~~ *THE POLYSTYRENE FOAM PACKAGING MATERIAL MANUFACTURING SYSTEM.*

Conditions:

1. OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN ACCORDANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED UNLESS OTHERWISE NOTED BELOW.

[RULE 204]

2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.

[RULE 204]

~~3. THE OXIDIZER SHALL BE FIRED ON NATURAL GAS ONLY.
[RULE 1303(a)(1)-BACT]~~

3. *THIS EQUIPMENT IS SUBJECT TO THE APPLICABLE REQUIREMENTS OF THE FOLLOWING RULES OR REGULATIONS:*

NOX, RULE 1147

VOC CAPTURE EFFICIENCY AND VOC DESTRUCTION EFFICIENCY, RULE 1175

[RULE 1147, RULE 1175, RULE 1303(A)(1)-BACT]

4. *EFFECTIVE ON JULY 1, 2013, THE NOX EMISSIONS DISCHARGED FROM THIS EQUIPMENT SHALL NOT EXCEED 60 PPMV, CALCULATED AS NO₂, BY VOLUME ON A DRY BASIS AT 3% O₂. FOR THE PURPOSE OF THIS CONDITION, THE EMISSION LIMIT SHALL APPLY SOLELY WHEN BURNING 100% FUEL AND NOT WHEN THE BURNER IS INCINERATING AIR TOXIC, VOCS, OR OTHER VAPORS.*

[RULE 1147]

5. *THE OPERATOR SHALL INSTALL AND MAINTAIN IN SERVICE NON-RESETTABLE, TOTALIZING FUEL AND TIME METERS FOR THE FUEL BEING SUPPLIED TO THIS EQUIPMENT.*

[RULE 1147]

6. *THIS EQUIPMENT SHALL BE MAINTAINED AND OPERATED AT A MINIMUM VOC DESTRUCTION EFFICIENCY OF 95% WHEN THE BASIC EQUIPMENT IT SERVES IS IN OPERATION.*

[RULE 1175, RULE 1303(A)(1)-BACT]



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7. **THE PERMANENT TOTAL ENCLOSURES SHALL BE MAINTAINED AND OPERATED IN COMPLIANCE WITH CRITERIA SPECIFIED IN EPA METHOD 204 – CRITERIA FOR AND VERIFICATION OF A PERMANENT OR TEMPORARY TOTAL ENCLOSURE, WHEN THE BASIC EQUIPMENT THEY SERVE ARE IN OPERATION.**
[RULE 1175, RULE 1303(A)(1)-BACT]

8. A STRIP-CHART RECORDER SHALL BE INSTALLED TO MEASURE AND RECORD THE TEMPERATURE IN THE COMBUSTION ZONE WHICH SHALL BE A MINIMUM OF 1,450 DEGREES FAHRENHEIT. THESE RECORDS SHALL BE RETAINED FOR AT LEAST **TWO FIVE (5)** YEARS AND BE MADE AVAILABLE TO DISTRICT PERSONNEL UPON REQUEST.
[RULE 1175, RULE 1303(a)(1)-BACT]

- ~~9. THIS EQUIPMENT SHALL BE OPERATED WHENEVER THE PROCESSES IT SERVES ARE IN OPERATION FOR COMPLIANCE WITH RULE 1175.~~
~~*[RULE 1303(a)(1)-BACT]*~~

9. **THE OPERATOR SHALL MAINTAIN THE PERMANENT TOTAL ENCLOSURES UNDER A NEGATIVE PRESSURE OF AT LEAST 0.007 INCHES WATER COLUMN.**
[RULE 1175; RULE 1303(b)(2)-Offset]

10. **THE OPERATOR SHALL INSTALL AND MAINTAIN A DIFFERENTIAL PRESSURE MONITORING DEVICE FOR EACH PERMANENT TOTAL ENCLOSURE, WHICH MONITORS THE DIFFERENTIAL PRESSURE BETWEEN THE INSIDE AND OUTSIDE OF THE PERMANENT TOTAL ENCLOSURE.**
[RULE 1175; RULE 1303(b)(2)-Offset]

11. **THE OPERATOR SHALL RECORD THE DIFFERENTIAL PRESSURES BEING MONITORED DAILY. THESE RECORDS SHALL BE RETAINED FOR AT LEAST FIVE (5) YEARS AND BE MADE AVAILABLE TO DISTRICT PERSONNEL UPON REQUEST.**
[RULE 1175; RULE 1303(b)(2)-Offset]

Periodic Monitoring:

- ~~12. THE OPERATOR SHALL CONDUCT AN INSPECTION FOR VISIBLE EMISSIONS FROM ALL STACKS AND OTHER EMISSION POINTS OF THIS EQUIPMENT WHENEVER THERE IS A PUBLIC COMPLAINT OF VISIBLE EMISSIONS, WHENEVER VISIBLE EMISSIONS ARE OBSERVED, AND ON AN ANNUAL BASIS, AT LEAST, UNLESS THE EQUIPMENT DID NOT OPERATE DURING THE ENTIRE ANNUAL PERIOD. THE ROUTINE ANNUAL INSPECTION SHALL BE CONDUCTED WHILE THE EQUIPMENT IS IN OPERATION AND DURING DAYLIGHT HOURS. IF ANY VISIBLE EMISSIONS (NOT INCLUDING CONDENSED WATER VAPOR) ARE DETECTED THAT LAST MORE THAN THREE MINUTES IN ANY ONE HOUR, THE OPERATOR SHALL EITHER:~~



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- ~~A. VERIFY AND CERTIFY WITHIN 24 HOURS THAT THE EQUIPMENT CAUSING THE EMISSION AND ANY ASSOCIATED AIR POLLUTION CONTROL EQUIPMENT ARE OPERATING NORMALLY ACCORDING TO THEIR DESIGN AND STANDARD PROCEDURES AND UNDER THE SAME CONDITIONS UNDER WHICH COMPLIANCE WAS ACHIEVED IN THE PAST;~~
- ~~B. TAKE CORRECTIVE ACTION(S) THAT ELIMINATES THE VISIBLE EMISSIONS WITHIN 24 HOURS AND REPORT THE VISIBLE EMISSIONS AS A POTENTIAL DEVIATION IN ACCORDANCE WITH THE REPORTING REQUIREMENTS IN SECTION K OF THIS PERMIT; OR~~
- ~~C. HAVE A CARB-CERTIFIED SMOKE READER DETERMINE COMPLIANCE WITH THE OPACITY STANDARD, USING EPA METHOD 9 OR THE PROCEDURES IN THE CARB MANUAL "VISIBLE EMISSION EVALUATION", WITHIN THREE BUSINESS DAYS AND REPORT ANY DEVIATIONS TO AQMD.~~

~~THE OPERATOR SHALL KEEP THE RECORDS IN ACCORDANCE WITH THE RECORDKEEPING REQUIREMENTS IN SECTION K OF THIS PERMIT AND THE FOLLOWING RECORDS:~~

- ~~A. STACK OR EMISSION POINT IDENTIFICATION;~~
 - ~~B. DESCRIPTION OF ANY CORRECTIVE ACTIONS TAKEN TO ABATE VISIBLE EMISSIONS;~~
 - ~~C. DATE AND TIME VISIBLE EMISSION WAS ABATED; AND~~
 - ~~D. VISIBLE EMISSION OBSERVATION RECORDED BY A CERTIFIED SMOKE READER.~~
- ~~[RULE 3004(a)(4)]~~

12. THE OPERATOR OF THIS EQUIPMENT SHALL CONDUCT SOURCE TESTS IN ACCORDANCE WITH THE FOLLOWING CONDITIONS:

- A. A SOURCE TEST SHALL BE CONDUCTED ONCE EVERY FIVE YEARS. THE FIRST SOURCE TEST SHALL BE CONDUCTED WITHIN 180 DAYS AFTER THE CONSTRUCTION OF THE PERMANENT ENCLOSURES ARE COMPLETED, UNLESS OTHERWISE APPROVED IN WRITING BY THE EXECUTIVE OFFICER.**
- B. THE SOURCE TEST SHALL BE PERFORMED TO VERIFY COMPLIANCE WITH USEPA METHOD 204—CRITERIA FOR AND VERIFICATION OF A PERMANENT OR TEMPORARY TOTAL ENCLOSURE.**
- C. THE SOURCE TEST SHALL BE PERFORMED TO VERIFY COMPLIANCE WITH THE VOC DESTRUCTION EFFICIENCY SPECIFIED BY CONDITION NO. 6, ABOVE, USING THE TEST METHODS SPECIFIED IN RULE 1175.**
- D. THE SOURCE TEST SHALL BE PERFORMED TO VERIFY THE VOC EMISSION FACTOR FOR POLYSTYRENE FOAM PACKAGING MATERIAL MANUFACTURING SYSTEM, WHICH IS SPECIFIED BY THE FACILITY-WIDE CONDITIONS, USING THE TEST METHODS SPECIFIED IN RULE 1175.**



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- E. THE SOURCE TEST SHALL BE CONDUCTED WHILE THE BASIC EQUIPMENT IS OPERATING WITH THE MAXIMUM AVAILABLE INITIAL BLOWING AGENT CONTENT.***

- F. THE OPERATOR SHALL PROVIDE TO THE DISTRICT A SOURCE TEST REPORT CONTAINING, AT A MINIMUM, THE FOLLOWING INFORMATION:***

 - 1) VOC EMISSIONS AT INLET AND OUTLET OF THE RTO SIMULTANEOUSLY, IN PPMV AND LBS/HR,***
 - 2) VOC DESTRUCTION EFFICIENCY, IN PERCENT,***
 - 3) FLOW RATE, IN ACTUAL AND STANDARD CUBIC FEET PER MINUTE (ACFM AND SCFM),***
 - 4) RTO COMBUSTION CHAMBER TEMPERATURE, IN DEGREE FAHRENHEIT,***
 - 5) TOTAL RAW MATERIAL PROCESS WEIGHT, IN POUNDS PER HOUR,***
 - 6) LOOSE FILL PRODUCTION RATE, IN POUNDS PER HOUR,***
 - 7) RAW MATERIAL BLOWING AGENT CONCENTRATION, IN PERCENT BY WEIGHT,***
 - 8) PRODUCT BLOWING AGENT CONCENTRATION, IN PERCENT BY WEIGHT,***
 - 9) FACIAL VELOCITIES AT ALL NATURAL DRAFT OPENINGS OF THIS EQUIPMENT, IN FEET PER MINUTE (FPM), AND***
 - 10) DIFFERENTIAL PRESSURES OF ALL PERMANENT TOTAL ENCLOSURES, IN INCHES WATER COLUMN.***

- G. 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.***

- H. 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.***

- I. SOURCE TEST SHALL BE CONDUCTED IN ACCORDANCE WITH THE EQUIPMENT CONFIGURATION AND OPERATION SPECIFIED IN THE TEST PROTOCOL APPROVED IN WRITING BY THE DISTRICT.***

- J. 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.***



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K. 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.

L. THE SOURCE TEST SHALL BE CONDUCTED ACCORDING TO A DISTRICT APPROVED PROTOCOL.

[RULE 1175, RULE 1303(a)(1)-BACT, RULE 3004(a)(4)-Periodic Monitoring]

Emissions And Requirements:

13. THIS EQUIPMENT IS SUBJECT TO THE APPLICABLE REQUIREMENTS OF THE FOLLOWING RULES AND REGULATIONS:

- CO: 2000 PPMV, RULE 407
- PM: 0.1 GR/SCF, RULE 409
- PM: RULE 404, SEE APPENDIX B FOR EMISSION LIMITS
- NOX: RULE 1147***
- VOC: RULE 1175

Appl. No. 511763 – Minor Title V Facility Permit Revision

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

In addition, Permit No. F50885 is administratively revised to reflect the discrepancies as follow:

POLYSTYRENE FOAM PACKAGING ***MATERIAL*** MANUFACTURING SYSTEM CONSISTING OF:

- A. EXTRUSION ~~PELLETIZING~~ ***AND LOOSE-FILL PARTICLES FORMING***
 - 1. TWO POLYSTYRENE ***PELLETS*** RECEIVING HOPPERS, 4'-0" W. X 4'-0" L. X 3'-6" H, EACH WITH A 1-HP FEED SCREW CONVEYOR.
 - 2. EXTRUDER, BERLYN, WITH A 200-LB CAPACITY FEED HOPPER, A 3.5 INCH SCREW WITH A 75-HP DRIVE AND A PREHEATED POLYSTYRENE/BLOWING AGENT MIXING CHAMBER, 2'-0" W. 12'-0" L. X 4'-6" H.
 - 3. EXTRUDER, BERLYN, WITH A 200-LB CAPACITY FEED HOPPER, A 3.5-INCH SCREW WITH A 75-HP DRIVE AND A PREHEATED POLYSTYRENE/BLOWING AGENT MIXING CHAMBER, 2'-0" W. X 12'-0" L. X 4'-6" H.
 - 4. TWO EIGHT-STRAND EXPANSION STRETCH CONVEYORS, EACH 33'-0" L., WITH A DISC CRIMPER, AND AN ANTI-STATIC LIQUID BATH, 2'-0" W. X 3'-0" L. X 0'-2" D.



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5. TWO STRAND CHOPPERS, *FOR CUTTING THE STRANDS INTO LOOSE-FILL PARTICLES*, EACH 5 HP.
- B. FIRST **PELLETS LOOSE-FILL PARTICLES** EXPANSION, COOLING, AND CURING
1. TWO PNEUMATIC CONVEYORS, PUSHER TYPE, EACH WITH A 5-HP BLOWER FOR CONVEYING **CHOPPED POLYSTYRENE FIGURE-EIGHT PELLETS LOOSE-FILL PARTICLES** TO THE FIRST EXPANSION CHAMBER.
 2. TWO FIRST EXPANSION CHAMBERS, 2'-6" W. X 21'-0" L. X 5'-0" H., EACH WITH A FABRIC AND STEEL RECEIVING HOPPER, 3'-0" W. X 3'-0" L. X 8'-0" H., A STEAM INJECTION CHAMBER, 2'-3" W. X 18'-0" L. X 5'-0" H., WITH TWO CANOPY HOODS, A FRONT HOOD, 4'-3" W. X 2'-3" L. X 2'-0" H., A REAR HOOD, 4'-3" W. X 3'-10" L. X 2'-6" H., AND A SAMPLING PORT, 2'-0" W. X 1'-8" L.
 3. PNEUMATIC CONVEYOR, PUSHER TYPE, WITH A 5-HP BLOWER FOR CONVEYING **CHOPPED POLYSTYRENE FIGURE-EIGHT PELLETS LOOSE-FILL PARTICLES** TO THE MONORAIL COOLING AND CURING SURGE SECTION
 4. INTERMEDIATE STORAGE ROOM, 40'-0" W. X 63'-0" L. X 25'-0" H., *COMMON WITH AIR POLLUTION CONTROL SYSTEM*, WITH TWELVE INTERMEDIATE HOPPERS, FABRIC AND METAL, 16'-0" W. X 8'-0" L. X 18'-0" H.
 5. PNEUMATIC CONVEYOR, PUSHER TYPE, WITH A 5-HP BLOWER FOR CONVEYING *LOOSE-FILL PARTICLES* TO THE SECOND EXPANSION CHAMBER
- C. SECOND **PELLETS LOOSE-FILL PARTICLES** EXPANSION AND DRYING.
1. ONE SECOND EXPANSION CHAMBER, 2'-6"W X 21'-0"L X 5'-0"H, WITH A FABRIC AND STEEL RECEIVING HOPPER, 3'-0"W X 3'-0"L X 8'-0"H, A STEAM INJECTION CHAMBER, 2'-3"W X 18'-0"L X 5'-0"H, WITH TWO CANOPY HOODS, A FRONT HOOD, 4'-3"W X 2'-3"L X 2'-3"L X 2'-0"H, A REAR HOOD, 4'-3"W X 3'-10"L X 2'-6"H, AND A SAMPLING PORT, 2'-0"W X 1'-8"L.
 2. PNEUMATIC CONVEYOR, PUSHER TYPE, WITH A 7.5-HP BLOWER FOR CONVEYING **CHOPPED POLYSTYRENE FIGURE-EIGHT PELLETS LOOSE-FILL PARTICLES** FROM THE SECOND EXPANSION CHAMBER TO THE MOISTURE BREAKBAG.
 3. MOISTURE BREAK BAG, CLOTH FABRIC, 10'-0"W X 10'-0"L X 18'-0"H
 4. PNEUMATIC CONVEYOR, PUSHER TYPE, WITH A 5-HP BLOWER FOR CONVEYING **CHOPPED POLYSTYRENE FIGURE-EIGHT PELLETS LOOSE-FILL PARTICLES** FROM THE MOISTURE BREAK BAG TO THE **HOT DRYING ROOM**.



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- 5. DRYING ROOM, *COMMON WITH AIR POLLUTION CONTROL SYSTEM*, WITH SIX HOLDING BINS, CLOTH FABRIC AND METAL, EACH 11'-0"W X 12'-0"L X 22'-0"H, WITH TAPERED BOTTOMS CONNECTED TO A COMMON 10-HP PNEUMATIC CONVEYOR, DISCHARGE LINE TO THE CHIP BREAK BAG IN PRODUCT STORAGE ROOM.

D. STORAGE ROOM I, *COMMON WITH AIR POLLUTION CONTROL SYSTEM*

- 1. CHIP BREAK BAG, CLOTH FABRIC, 4'-0"W X 4'-0"L X 16'-0"H, WITH TWO CLOTH DUST COLLECTION BAGS, 2'-0"DIA X 4'-0"H, EACH EMPTYING INTO AN OPEN TOP 50-GAL PLASTIC DRUM.
- 2. PNEUMATIC CONVEYOR, PUSHER TYPE, WITH A 10-HP BLOWER FOR CONVEYING ~~CHOPPED POLYSTYRENE FIGURE-EIGHT PELLETS~~ *LOOSE-FILL PARTICLES* FROM THE CHIP BREAK BAG TO THE STORAGE SILOS.
- 3. TEN STORAGE SILOS, FABRIC, 16'-0"W X 32'-0"L X 23'-0"H, EACH WITH TAPERED BOTTOMS, AND FOUR 0.2-HP BLOWERS FOR CONVEYING *LOOSE-FILL* PARTICLES TO THE DISCHARGE OF EACH SILO.
- 4. FOUR PNEUMATIC CONVEYORS, PUSHER TYPE, EACH WITH A 5-HP BLOWER FOR CONVEYING *LOOSE-FILL* PARTICLES FROM EACH OF THE TEN SILOS TO THE TRANSFER CHUTE BAGS.
- 5. TWO TRANSFER CHUTE BAGS, ONE 5'-0"W X 10"L X 23'-0"H AND 5'-0"W X 5'-0"L X 23'-0"H

E. STORAGE ROOM II, *COMMON WITH AIR POLLUTION CONTROL SYSTEM*

- 1. CHIP BREAK BAG, CLOTH FABRIC, 4'-0"W X 4'-0"L X 16'-0"H
- 2. FIVE STORAGE SILOS, FABRIC, 10'-0"W X 24'-0"L X 23'-0"H, EACH WITH TAPERED BOTTOMS, AND FOUR 0.2-HP BLOWERS FOR CONVEYING *LOOSE-FILL* PARTICLES TO THE DISCHARGE OF EACH SILO.
- 3. TRANSFER CHUTE BAG, 5'-0"W X 5'-0"L X 23'-0"H.

Conditions:

- 1. OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN ACCORDANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED UNLESS OTHERWISE NOTED BELOW.
[RULE 204]
- 2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.
[RULE 204]



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3. ~~THE THIS~~ EQUIPMENT ~~LISTED UNDER SECTIONS A THROUGH D~~ SHALL NOT BE OPERATED UNLESS ~~THEY ARE IT IS~~ VENTED ~~ONLY~~ TO AIR POLLUTION CONTROL EQUIPMENT WHICH IS IN FULL USE AND WHICH HAS BEEN ISSUED AN *OPERATING PERMIT* BY THE EXECUTIVE OFFICER.
[*RULE 1175*, RULE 1303(a)(1)-BACT]

~~4. THE TOTAL QUANTITY OF BLOWING AGENT (MIXTURE OF BUTANE AND PENTANE) VENTED TO THE ATMOSPHERE FROM THIS FACILITY SHALL NOT EXCEED 624 POUNDS IN ANY ONE DAY AVERAGED OVER 30 DAYS.~~
[~~RULE 1303(b)(2)-OFFSET~~]

This condition is revised and moved under facility-wide conditions!

4. THIS EQUIPMENT SHALL ~~OPERATE IN COMPLIANCE~~ *COMPLY* WITH *ALL APPLICABLE REQUIREMENTS OF* RULE 1175.
[RULE 1175]

5. THE OWNER OR OPERATOR SHALL CONDUCT A SOURCE TEST OF ~~THE EMISSION COLLECTION/DESTRUCTION SYSTEM~~ *THIS EQUIPMENT* ONCE EVERY FIVE YEARS TO ENSURE COMPLIANCE WITH RULE 1175. *THE SOURCE TEST SHALL BE CONDUCTED IN ACCORDANCE WITH THE CONDITIONS SPECIFIED IN THE OPERATING PERMIT OF THE AIR POLLUTION CONTROL EQUIPMENT.*
[RULE 1175]

6. *THE OPERATOR SHALL KEEP THE POLYSTYRENE FOAM PRODUCTS IN THE STORAGE ROOMS I AND II FOR AT LEAST 48 HOURS.*
[*RULE 1175*]

7. THE OPERATOR SHALL ~~KEEP ADEQUATE~~ *MAINTAIN A DAILY* RECORDS ~~TO DETERMINE THE AMOUNT OF BLOWING AGENT USED AS DERIVED FROM STORAGE TANKS GAUGE READINGS TO VERIFY COMPLIANCE WITH CONDITION NO. 3 OF OPERATION OF THIS EQUIPMENT, INCLUDING BUT NOT LIMITED TO THE AMOUNT OF RAW MATERIAL PROCESSED, THE EQUIPMENT USED, AND THE TYPE OF BLOWING AGENT USED.~~ THE RECORDS SHALL BE MAINTAINED FOR A PERIOD OF ~~TWO~~ *FIVE (5)* YEARS AND MADE AVAILABLE TO DISTRICT PERSONNEL UPON REQUEST.
[*RULE 1175*]

8. *THE OPERATOR SHALL MAINTAIN ADEQUATE RECORDS TO VERIFY COMPLIANCE WITH CONDITION NO. 6, ABOVE. THE RECORDS SHALL BE MAINTAINED FOR A PERIOD OF FIVE (5) YEARS AND MADE AVAILABLE TO THE EXECUTIVE OFFICER OR HIS REPRESENTATIVE UPON REQUEST. THE RECORDS SHALL INCLUDE, AT A MINIMUM, THE FOLLOWING INFORMATION:*

- 1) *THE DATE AND TIME WHEN POLYSTYRENE FOAM PRODUCTS ARE BEING TRANSPORTED INTO THE STORAGE BAGS IN THE STORAGE ROOMS I AND II.*



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2) THE DATE AND TIME WHEN POLYSTYRENE FOAM PRODUCTS ARE BEING REMOVED FROM THE STORAGE BAGS IN THE STORAGE ROOMS I AND II.

[RULE 1175]

Periodic Monitoring:

9. THE OPERATOR SHALL CONDUCT AN INSPECTION FOR VISIBLE EMISSIONS FROM ALL STACKS AND OTHER EMISSION POINTS OF THIS EQUIPMENT WHENEVER THERE IS A PUBLIC COMPLAINT OF VISIBLE EMISSIONS, WHENEVER VISIBLE EMISSIONS ARE OBSERVED, AND ON AN ANNUAL BASIS, AT LEAST, UNLESS THE EQUIPMENT DID NOT OPERATE DURING THE ENTIRE ANNUAL PERIOD. THE ROUTINE ANNUAL INSPECTION SHALL BE CONDUCTED WHILE THE EQUIPMENT IS IN OPERATION AND DURING DAYLIGHT HOURS. IF ANY VISIBLE EMISSIONS (NOT INCLUDING CONDENSED WATER VAPOR) ARE DETECTED THAT LAST MORE THAN THREE MINUTES IN ANY ONE-HOUR, THE OPERATOR SHALL EITHER:

- A. VERIFY AND CERTIFY WITHIN 24 HOURS THAT THE EQUIPMENT CAUSING THE EMISSION AND ANY ASSOCIATED AIR POLLUTION CONTROL EQUIPMENT ARE OPERATING NORMALLY ACCORDING TO THEIR DESIGN AND STANDARD PROCEDURES AND UNDER THE SAME CONDITIONS UNDER WHICH COMPLIANCE WAS ACHIEVED IN THE PAST;
- B. TAKE CORRECTIVE ACTION(S) THAT ELIMINATES THE VISIBLE EMISSIONS WITHIN 24 HOURS AND REPORT THE VISIBLE EMISSIONS AS A POTENTIAL DEVIATION IN ACCORDANCE WITH THE REPORTING REQUIREMENTS IN SECTION K OF THIS PERMIT; OR
- C. HAVE A CARB-CERTIFIED SMOKE READER DETERMINE COMPLIANCE WITH THE OPACITY STANDARD, USING EPA METHOD 9 OR THE PROCEDURES IN THE CARB MANUAL "VISIBLE EMISSION EVALUATION", WITHIN THREE BUSINESS DAYS AND REPORT ANY DEVIATIONS TO AQMD.

THE OPERATOR SHALL KEEP THE RECORDS IN ACCORDANCE WITH THE RECORDKEEPING REQUIREMENTS IN SECTION K OF THIS PERMIT AND THE FOLLOWING RECORDS:

- A. STACK OR EMISSION POINT IDENTIFICATION;
 - B. DESCRIPTION OF ANY CORRECTIVE ACTIONS TAKEN TO ABATE VISIBLE EMISSIONS;
 - C. DATE AND TIME VISIBLE EMISSION WAS ABATED; AND
 - D. VISIBLE EMISSION OBSERVATION RECORDED BY A CERTIFIED SMOKE READER.
- [RULE 3004 (a)(4)]

Emissions And Requirements:



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10. THIS EQUIPMENT IS SUBJECT TO THE APPLICABLE REQUIREMENTS OF THE FOLLOWING RULES AND REGULATIONS:

- VOC: RULE 1175
- PM: RULE 404, SEE APPENDIX B FOR EMISSION LIMITS
- PM: RULE 405, SEE APPENDIX B FOR EMISSION LIMITS

FACILITY WIDE CONDITION(S)

Condition(s):

1. EXCEPT FOR OPEN ABRASIVE BLASTING OPERATIONS, THE OPERATOR SHALL NOT DISCHARGE INTO THE ATMOSPHERE FROM ANY SINGLE SOURCE OF EMISSIONS WHATSOEVER ANY AIR CONTAMINANT FOR A PERIOD OR PERIODS AGGREGATING MORE THAN THREE MINUTES IN ANY ONE HOUR WHICH IS:
 - A. AS DARK OR DARKER IN SHADE AS THAT DESIGNATED NO. 1 ON THE RINGLEMANN CHART, AS PUBLISHED BY THE UNITED STATES BUREAU OF MINES; OR
 - B. OF SUCH OPACITY AS TO OBSCURE AN OBSERVER’S VIEW TO A DEGREE EQUAL TO OR GREATER THAN DOES SMOKE DESCRIBED IN SUBPARAGRAPH (a) OF THIS CONDITION.

[RULE 401]

2. *THE TOTAL QUANTITY OF VOLATILE ORGANIC COMPOUNDS (VOC) EMISSIONS FROM THIS FACILITY SHALL NOT EXCEED 624 POUNDS IN ANY ONE DAY AVERAGED OVER 30 DAYS.*
[RULE 1303(b)(2)-OFFSET]
3. *TO DEMONSTRATE COMPLIANCE WITH CONDITION NO. 2 ABOVE, THE OPERATOR SHALL CALCULATE VOC EMISSIONS FROM THIS FACILITY USING THE FOLLOWING EQUATION:*

$$E_{TOTAL} = \sum E_i = \sum P_i E F_i$$

WHERE: E_{TOTAL} = TOTAL VOC EMISSIONS IN POUNDS PER DAY FROM THIS FACILITY, AVERAGED OVER 30 DAYS

E_i = VOC EMISSIONS IN POUNDS PER DAY FROM EACH PROCESS, AVERAGED OVER 30 DAYS

P_i = TOTAL AMOUNT OF RAW MATERIALS USED FOR EACH PROCESS, IN POUNDS PER DAY, 30-DAY ROLLING AVERAGE



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EF_i = VOC EMISSION FACTOR FOR EACH PROCESS, IN POUNDS VOC EMISSIONS PER POUND RAW MATERIALS USED

FOR POLYSTYRENE FOAM PACKAGING MATERIAL MANUFACTURING SYSTEM, EF_i SHALL BE 0.02377 POUNDS VOC EMISSIONS PER POUND RAW MATERIALS USED.

BASED ON THE SOURCE TEST RESULTS, THE EMISSION FACTOR FOR EACH PROCESS MAY BE ADJUSTED AND THE FACILITY PERMIT HOLDER WILL BE NOTIFIED. UPON NOTIFICATION FROM THE DISTRICT, THE ADJUSTED EMISSION FACTOR SHALL BE USED FOR THE EMISSION CALCULATIONS.

[RULE 1303(b)(2)-OFFSET]

- 4. THE OPERATOR SHALL MAINTAIN ADEQUATE RECORDS TO VERIFY COMPLIANCE WITH CONDITION NO. 2, ABOVE. THE RECORDS SHALL BE MAINTAINED FOR A PERIOD OF FIVE (5) YEARS AND MADE AVAILABLE TO THE EXECUTIVE OFFICER OR HIS REPRESENTATIVE UPON REQUEST.*

[RULE 1303(b)(2)-OFFSET, RULE 3004(a)(4)-Periodic Monitoring]

BACKGROUND/HISTORY

Free Flow Packaging International Inc. (“Free Flow”) is located in City of Commerce, California. Free Flow processes recycled polystyrene foam products into polystyrene foam packaging materials (loose fills). Free Flow currently operates one polystyrene foam packaging manufacturing system, two boilers and one blowing agent storage tank. The polystyrene foam packaging manufacturing system consists of two extruders, two 1st expanders and one 2nd expander, intermediate storage room, hot room, two final storage rooms, and associated conveyors and hoppers. The VOC emissions from the polystyrene foam packaging manufacturing system are subject to Rule 1175 and they are being controlled by a regenerative thermal oxidizer.

Free Flow facility type:

<u>RECLAIM</u>		<u>Title V</u>
SOx	NOx	
No	No	Yes

Free Flow is a Title V facility. The initial Title V Permit for the facility was issued on August 1, 2002 and expired on July 31, 2007. A Title V Permit Renewal application (A/N: 464691) was submitted on January 18, 2007, but it has not been processed due to Rule 1175 compliance issues (see detail discussion under process description section).

On January 14, 2010, a Rule 1175 compliance test was performed on the polystyrene foam packaging manufacturing system at Free Flow. The test results were summarized in a report dated March 29, 2010. The report indicated VOC emissions of 4.7 lbs per 100 lbs of raw material processed, which is significantly greater than the 2.4 lbs limit required by Rule 1175(c)(2). In addition, the report indicated a collection efficiency of 41.7% and a destruction efficiency of 87.9% for the APC system, which are below the minimum requirements of 90% and 95% of Rule 1175(c)(4). Rule 1175(c)(4)(A) requires the facility



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to submit a permit application for the installation of an APC system that will meet with the 90% collection and 95% destruction efficiencies within four months of the date that compliance with (c)(2) requirement was not achieved. Therefore, on June 16, 2010, Free Flow submitted the applications as indicated as follows:

<u>Appl. No.</u>	<u>Type</u>	<u>Previous Permit No.</u>	<u>Equipment</u>
511762	Modification	F5025	APC System - Regenerative Thermal Oxidizer
511763	Plan	N/A	Title V Minor Permit Revision

Appl. No. 511762 is submitted as a class-I application to modify the emission collection system in order for the APC system to meet with 90% collection efficiency as required by Rule 1175. The proposed modifications to the emission collection system are indicated as follows:

- Install a Permanent Total Enclosure (PTE) to enclose the two extruders, two 1st expanders and one 2nd expander.
- Change the existing enclosures to a PTE type. The existing enclosures include the Intermediate Storage Room, the Hot Room, the Storage Room I and Storage Room II.
- Install two additional booster blowers to ensure the new PTE and the existing enclosures meet with EPA Method 204 requirements.

Appl. No. 511763 is submitted as a plan application for the minor revision of the Title V permit as specified in Rule 301.

PROCESS DESCRIPTION

Free Flow reclaims polystyrene materials from recycled polystyrene foam products, and then re-processes the reclaimed polystyrene materials into expanded polystyrene foam packaging materials (loose fills). The polystyrene reclaim process is done through uses of two polystyrene foam grinders, foam flakes storage silos, one extruder, one pelletizer, pellet storage silos, and associated pneumatic conveying systems. The polystyrene foam loose fill manufacturing process is done through uses of two extruders, two 1st expanders, one process reclaim grinder, one intermediate storage room for curing/aging/expansion, one 2nd expander, one hot room for drying/aging/expansion, and two final storage rooms for aging/expansion, and associated pneumatic conveying systems.



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Polystyrene Foam Packaging Material Manufacturing System

The polystyrene foam packaging manufacturing system is a continuous flow system to process the reclaimed polystyrene materials to polystyrene loose fills.

Extrusion (two extruders)

In the extruder, the reclaimed polystyrene pellets are melted and mixed with a blowing agent at temperatures around 280 to 300°F and pressures of up to 3,000 psig. The blowing agent is a 50/50 mixture of iso-butane and iso-pentane by weight. The molten mix from the extruder is pushed through a set of dies that produce strands in the shape of continuous tubes.

Figure “8” Maker and Strand Bath

The tubes are fed through a disc crimper that welds the tubes bi-laterally. They then pass through an anti-static liquid bath to aid in the elimination of static charge.

Cutter-Puller

The crimped tubes are then drawn into a device that pulls them away from the extruder and chops them evenly into figure “8” strands. The figure “8” strands are then pneumatically conveyed to the 1st expander.

1st Expansion (two 1st Expanders)

The figure “8” strands are processed through a belt type steam tunnel which subjects them to 212°F for about one minute. While in the tunnel, the strands expand and quickly contract again when removed from the steam heat. The expanded figure “8” strands are then pneumatically conveyed to the storage silos in the intermediate storage room.

Intermediate Storage Room

The intermediate storage room is used as a cooling and curing area. In this room, the figure “8” strands are aged for 3 to 8 hours prior to 2nd steam expansion. During this period, the strands slowly expand to about 80% of their full and final size loose fills.

2nd Expansion (one 2nd Expander only)

The 80% expanded figure “8” shape loose fills are then pneumatically conveyed to the 2nd expander, where they are processed through a belt type steam tunnel which subjects them to about 180°F for about 30 seconds. The 2nd expander will soften and stretch the loose fills to allow them for further expansion.



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Hot Room

The loose fills from the 2nd expander are pneumatically conveyed to a moisture break bag in the hot room, where they are blown with force against a mesh fabric to separate water droplets from them. The loose fills are then blown to the storage silos in the hot room to be stored at 140 to 160°F for 2 to 4 hours; and during this period the residual moisture is completely removed from the loose fills.

Final Storage Rooms (Storage Room I and Storage Room II)

The loose fills from the hot room are pneumatically conveyed to a chip break bag in a final storage room, where they are blown with force against a mesh fabric to separate them from any chips and dust that may have formed. The loose fills are then blown to the large product storage silos in the final storage room to be stored for 48 hours; and during this period the loose fills are cured and equilibrated with air. After the loose fills being stored in the final storage room for 48 hours, they are either pneumatically conveyed to a bag packer or a bulk truck loading station.

VOC Emissions and Offset Requirements

The VOC emissions occur throughout loose fill manufacturing process steps. The current operating permit (F50885) is limiting the total blowing agent (mixture of butane and pentane) emissions from Free Flow not to exceed 624 lbs/day averaged over 30 days. This limit was first imposed under A/N 318045 (P/O F7261) based on 595 pounds purchased offset credits plus 29 pounds from the Community Bank.

Rule 1175 Compliance History

Free Flow is a Title V facility. The initial Title V Permit for the facility was issued on August 1, 2002 and expired on July 31, 2007.

On November 18, 1996, the Polystyrene Foam Packaging Manufacturing System was first time tested to demonstrate the compliance with the Rule 1175. The test was conducted as required by the variance case no. 3664-2 and by condition no. 6 of the Permit to Construct A/N: 309306 for the APC system. The source test report was submitted to the District and the test results indicated the VOC emissions of 2.01 lbs per 100 lbs raw materials processed, which was in compliance with rule 1175(c)(2). The District permit processing engineer accepted the test results and issued the Permit to Operate for the APC system (F5025) on January 29, 1997. The permit processing engineer issued the Permit to Operate without having the source test report approved the District M&STE.

On July 11, 2006, the District M&STE issued a “Special Evaluation Report” (reference no.: 06312) for the 1996 test report. Although this evaluation report was not prepared for the Rule 1175 compliance determination, in his “Special Evaluation Report”, the District Source Test Engineer concluded the following findings:

- The VOC collection efficiency and the overall control efficiency could not be determined.
- The residual blowing agent remained in the products could not be determined.



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- The VOC destruction efficiency of the RTO was 97.5%.

Based on these findings, the results from the 1996 source test actually were not sufficient for the determination of Rule 1175 compliance status.

On May 3, 2007, Free Flow submitted a source test protocol for the 2nd Rule 1175 compliance test per condition no. 4 of the Permit to Operate (F50885). After numbers of revisions made as requested, the protocol was deemed to be “Acceptable” by the District M&STE on November 3, 2009 (Reference: 07139). The test was performed on January 14, 2010. The test report was prepared on March 29, 2010 and submitted to the District. This test report was deemed as “Unacceptable” by the District M&STE on April 16, 2010 (Reference: 07139). The test report indicated the following results:

- The exhaust system collection efficiency: 41.7% (for manufacturing emissions)
- The RTO destruction efficiency: 87.9%
- The residual blowing agent remained in the product: 2.76% (after 24 hrs of storage)
- The residual blowing agent remained in the product: 2.28% (after 48 hrs of storage)
- The residual blowing agent remained in the product: 2.36% (after 60 hrs of storage)
- The residual blowing agent remained in the product: 2.25% (after 72 hrs of storage)
- Rule 1175(c)(2) compliance calculation: **4.7 lbs per 100 lbs raw materials processed**

Based on these test results, Free Flow failed to comply with Rule 1175. Since then Free Flow has decided to change its compliance option from Rule 1175(c)(2) to Rule 1175(c)(4). Free Flow conducted the following measures to become in compliance with the rule:

- Free Flow submitted this application to install PTEs for the polystyrene loose fills production and storage areas to increase the collection efficiency of the emission collection system. The PTEs will be installed in accordance with the EPA Method 204 requirements. The PTEs meeting EPA Method 204 requirements are considered to have 100% VOC capture efficiency.
- Free Flow conducted an investigation for the cause of the low destruction efficiency of the RTO during the January source test. The problem they found was a malfunction of the poppet valve that controls the flow process air to the two chambers of the RTO. Repairs to the poppet valve were made in March of this year. Another test was performed on June 16, 2010 and the test results show a destruction efficiency of 99.0% of the RTO. The test report has not been submitted to the District. The RTO is currently operating in compliance.
- Free Flow will storage the loose fills in the PTEs for at least 48 hours as required by Rule 1175(c)(4)(B)(ii).

EMISSION CALCULATIONS

This application is to modify the emission collection system in order for the APC system to meet with 90% collection efficiency as required by Rule 1175; thus, no emission increases are expected due to this modification. However, in addition to the calculations of control capacity and combustion emissions of the RTO, two other calculations will be performed to ensure the following requirements to be met:



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- EPA Method 204 requirements
- The blowing agent emissions not to exceed 624 lbs/day averaged over 30 days (P/O F50885, Condition No. 3)

RTO's Control Capacity

Properties of Air

Enthalpy of air in combustion chamber (1,600 °F Max.) = 30.38 Btu/scf
 Enthalpy of air at RTO inlet (77 °F Std.) = 0.74 Btu/scf
 Enthalpy of air at RTO exhaust stack (300 °F Max.) = 4.42 Btu/scf

Energy loss due to heat convection:

$$4.42 \text{ Btu/scf} - 0.74 \text{ Btu/scf} = 3.68 \text{ Btu/scf}$$

Assume 5% energy loss due to heat conduction:

$$(30.38 \text{ Btu/scf} - 0.74 \text{ Btu/scf}) (5\%) = 1.48 \text{ Btu/scf}$$

Total Energy Loss:

$$3.68 \text{ Btu/scf} + 1.48 \text{ Btu/scf} = 5.16 \text{ Btu/scf}$$

Heat of Combustion for iso-pentane: 19,314 Btu/lb

Heat of Combustion for iso-butane: 19,458 Btu/lb

Heat of Combustion for 50/50 by weight mixture: $(19,314 \text{ Btu/lb} + 19,458 \text{ Btu/lb}) / 2 = 19,386 \text{ Btu/lb}$

Therefore, the RTO capacity is calculated as follows:

$$(5.16 \text{ Btu/scf}) (10,000 \text{ scfm}) (60 \text{ min/hr}) / (19,386 \text{ Btu/lb}) = 159.70 \text{ lbs/hr}$$

If 159.70 lbs/hr VOC is pure iso-pentane (LEL=1.4%), then the %LEL is calculated as follows:

$$\text{Iso-pentane: } \frac{159.70 \text{ lbs}}{\text{hr}} \times \frac{\text{lb-mole}}{72.15 \text{ lb}} \times \frac{379 \text{ scf}}{\text{lb-mole}} \times \frac{\text{min}}{10,000 \text{ scf}} \times \frac{\text{hr}}{60 \text{ min}} \times \frac{100}{1.4} = 10.0\% \text{ LEL } \text{Acceptable!}$$

If 159.70 lbs/hr VOC is pure iso-butane (LEL=1.8%), then the %LEL is calculated as follows:

$$\text{Iso-butane: } \frac{159.70 \text{ lbs}}{\text{hr}} \times \frac{\text{lb-mole}}{58.12 \text{ lb}} \times \frac{379 \text{ scf}}{\text{lb-mole}} \times \frac{\text{min}}{10,000 \text{ scf}} \times \frac{\text{hr}}{60 \text{ min}} \times \frac{100}{1.8} = 9.64\% \text{ LEL } \text{Acceptable!}$$

Discussion:

159.70 lbs/hr VOC accepted by the RTO will maintain the combustion chamber operated at a maximum temperature of 1,600 °F without addition of natural gas. If VOC acceptance rate is greater than 159.70



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lbs/hr, the heat will accumulate in the combustion chamber and the temperature will rise until the system is damaged. Some models of RTO may trigger a safety procedure such as venting the combustion chamber directly to the exhaust stack and bypass the ceramic packing materials; but this will lower the resident time and thus, lower the destruction efficiency. **Therefore, the VOC acceptance rate of 159.70 lbs/hr is the capacity of this RTO.**

Maximum Process Emissions:

Extruder No. 1 process weight (Max.): 450 lbs/hr

Extruder No. 2 process weight (Max.): 450 lbs/hr

Based on the 2010 January source test, approximately 5.87% raw materials are blowing agent, and 2.67 lbs blowing agent are remained in the products per 100 lbs raw materials (after 24 hrs product storage time).

Pre-modification

For 24 hrs product storage time, the VOC emissions are calculated as follows:

$$(450 \text{ lbs/hr} + 450 \text{ lbs/hr}) (5.87\% - 2.67\%) = 28.8 \text{ lbs/hr} \dots\dots\dots \text{within the RTO Control Capacity!}$$

Post-modification

For 48 hrs product storage time, the VOC emissions are calculated as follows:

$$(450 \text{ lbs/hr} + 450 \text{ lbs/hr}) (5.87\% - 2.20\%) = 33.21 \text{ lbs/hr} \dots\dots\dots \text{within the RTO Control Capacity!}$$

Combustion Emissions from the RTO

Data

- Operation (Maximum): 24 hrs/day, 7 days/wk, 52 wks/yr
- Combustion Air Blower: 10.00 H.P. and 1,470 scfm
- Process Air Blower: 60.00 H.P. and 10,000 scfm, Forced Draft
- Burner Rating: 2.4 MMBtu/hr
- Fuel Type: Natural gas only
- Retention time at normal operating temperature: 0.5 sec at 1,500 °F

Emission Factors

Emission Factors

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



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Emission Factor Summary - Natural Gas

Pollutant	Emission Factor (AQMD Default) lb/mmscf	Emission Factor (for this report) lb/MMBtu
VOC	7	0.00667
SO _x	0.6	0.000571
PM ₁₀	7.5	0.00714
NO _x	130	0.12381
CO	35	0.03333

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

The calculated afterburner combustion emission results are indicated below:

A/N 511762		Hourly (lbs/hr)	Daily (lbs/day)	Annually (lbs/yr)	30 day ave. (lbs/day)	30 day NSR (lbs/day)
R1=R2	VOC	0.0160	0.38	139.78	0.38	0
R1=R2	SO _x	0.00137	0.03	11.98	0.03	0
R1=R2	PM ₁₀	0.0171	0.41	149.76	0.41	0
R1=R2	NO _x	0.2971	7.13	2595.84	7.13	7
R1=R2	CO	0.080	1.92	698.88	1.92	2

Hourly (lbs/hr) = (Emission Factor, lbs/MMBtu) (2.4 MMBtu/hr)

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

Annually (lbs/yr) = (daily lbs/day) (7 days/wk) (52 wks/yr)

EPA Method 204 Analysis

A Permanent Total Enclosure (PTE) must meet the following criteria in order to be considered as to have 100% VOC capture efficiency:

1. All Natural Draft Opening (NDO) shall be at least four equivalent opening diameters from each VOC emitting point.
2. The total area of all NDO's shall not exceed 5% of the surface area of the enclosure's four walls, floor, and ceiling.
3. The average facial velocity (FV) of air through all NDO's shall be at least 200 fpm. The direction of air flow through all NDO's shall be into the enclosure.
4. All access doors and windows whose areas are not counted as NDO total area shall be closed during routine operation of the process.



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Facial Velocity (FV):

Extrusion Room: $FV = (6,600 \text{ scfm}) / (4 \times 4 \text{ ft}^2) = 412.5 \text{ fpm} > 200 \text{ fpm}$

PK Room A: $FV = (2,400 \text{ scfm}) / (3 \times 4 \text{ ft}^2) = 200 \text{ fpm}$

The applicant claims all other criteria will be met. Permit conditions will be stipulated to ensure compliance with this method.

VOC Emission Cap Analysis

P/O F50885, Condition No. 3 limits the blowing agent (BA) emissions not to exceed 624 lbs/day averaged over 30 days.

Feed Stream:

Extruder throughput (Max.): $(450 \text{ lb/hr each}) \times 2 \text{ Extruders} = 900 \text{ lbs/hr}$

BA concentration (based on 2010 Source Test): $(43.0 \text{ lbs/hr}) / (732 \text{ lbs/hr}) = 5.87\%$

BA to polystyrene ratio (based on 2010 Source Test): $(43.0 \text{ lbs/hr}) / (689 \text{ lbs/hr}) = 0.06241$

Polystyrene Throughput (Max.): $(900 \text{ lbs/hr}) (1 - 5.87\%) = 847.17 \text{ lbs/hr}$

Polystyrene Foam Loose Fill Product:

BA Concentration after 48 hrs storage (based on 2010 Source Test): 2.276%

BA to polystyrene ratio after 48 hrs storage: $(2.276\%) / (1 - 2.276\%) = 0.02329$

BA Emissions:

BA Manufacturing Emissions: $(847.17 \text{ lbs/hr}) (0.06241 - 0.02329) = 33.14 \text{ lbs/hr}$

BA Emissions as residual in the products: $(847.17 \text{ lbs/hr}) (0.02329) = 19.73 \text{ lbs/hr}$

Control Equipment:

Total PTE capture efficiency: 100% capture of the manufacturing emissions (assumption)

RTO destruction efficiency: 95% (assumption)

Total VOC Emissions from Polystyrene Foam Packaging Manufacturing System (P/O F50885):

$R1 = (33.14 \text{ lbs/hr}) + (19.73 \text{ lbs/hr}) = 52.87 \text{ lbs/hr}$, or 1,268.88 lbs/day

$R2 = (33.14 \text{ lbs/hr}) (100\%) (1 - 95\%) + (19.73 \text{ lbs/hr}) = 21.39 \text{ lbs/hr}$, or 513.29 lbs/daywithin the cap!

Blowing Agent Emission Factor Calculation:

$(21.39 \text{ lbs/hr}) / (900 \text{ lbs/hr}) = 0.02377$

RULES AND REGULATIONS EVALUATION

Rule 212: Standards for Approving Permits

Based on a review of the Google maps, it appears that the Bell Gardens High School is located to the south of the facility across Randolph Street. However, since 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.



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

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

Application A/N 511762 - RTO

(c)(1) – this RTO was installed in 1996, therefore it is subject to NOx emission limit of 60 ppm or 0.073 lb/mmBtu by July 1, 2013.

(c)(7) – On or after January 1, 2010, the operator shall perform combustion system maintenance in accordance with the manufacturer’s schedule and specifications as identified in the manual and other written materials supplied by the manufacturer or distributor. Condition No. 4 is added to ensure the compliance with this rule.

(c)(8) – This RTO is operating with variable heat input. Therefore, on or after January 1, 2011, the operator shall install and maintain in service non-resettable, totalizing, fuel and time meter for this RTO. Condition No. 4 is added to ensure the compliance with this rule.

Rule 1175: **Control of Emissions from the Manufacture of Polymeric Cellular (Foam) Products**

Free Flow choose to comply with this rule under section (c)(4). Section (c)(4) requires the APC system to have 95% destruction efficiency and 90% capture efficiency, and the emissions from the polystyrene foam product to be vented to the APC system for at least 48 hours.

Capture Efficiency

This application for the installation of PTEs for the polystyrene loose fills production and storage areas to increase the collection efficiency of the emission collection system. The PTEs will be installed in accordance with the EPA Method 204 requirements. The PTEs meeting EPA Method 204 requirements are considered to have 100% VOC capture efficiency.

Destruction Efficiency

Free Flow conducted a source test on June 16, 2010 and the test results show a destruction efficiency of 99.0% of the RTO. However, the test report has not been submitted to the District for approval.

48-hour product storage time requirement

The operating permit for the Polystyrene Foam Packaging Manufacturing System (P/O F50885) is administratively revised to reflect this requirement.

A source test condition no. 12 is stipulated in the construction permit to verify the compliance.

REG XIII: **New Source Review** - There are no emission increase associated with the proposed modification. No emission offset is required for these applications.



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Reg XXX: Title V Permit

Free Flow (Facility ID: 43605) is a Title V facility. The initial Title V Permit for the facility was issued on August 1, 2002 and expired on July 31, 2007. A Title V Permit Renewal application (A/N: 464691) was submitted on January 18, 2007, but it has not been processed due to Rule 1175 compliance issues (see detail discussion under process description section).

Application no. 511762 is to install PTEs for the VOC emission collection system as required by Rule 1175. No emission increase is expected for this modification project. Therefore, application no. 511762 is considered Minor Permit Revisions 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. 511763).

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 Construct is recommended to be issued.