Cornerstone
ENVIRONMENTAL HEALTH AND SAFETY
ISO 9001:2015 REGISTERED QUALITY SYSTEM

163-48006-00106
MAI 40047

Received
State of Indiana
JUN 25 2024
Dept of Environmental Mgmt
Office of Air Quality

CM-1

June 24, 2024

IDEM Air Permits Administration
ATTN: Incoming Application
100 North Senate Avenue
MC 61-53, IGCN 1003
Indianapolis, IN 46204-2251

Re: **Administrative Amendment Request**
Berry Global, Inc., 101 Oakley Street, Evansville, IN 47710
Minor Source Operating Permit (MSOP): 163-38767-00106
CEHS Project No.: 2568-17489-01

Dear Sir/Madam:

On behalf of Berry Global, Inc. (Berry Global), Cornerstone Environmental, Health & Safety (Cornerstone EH&S) respectfully submits this Administrative Amendment request in accordance with 326 IAC 2-6.1-6 (d)(2) and (8). IDEM issued MSOP No. 163-38767-00106 to Berry Global on November 9, 2017 (and most recently amended on September 20, 2023) for the operation of emission units located at the above address. Berry Global proposes changes as follows:

1) Addition of three (3) new injection molding machines, #67, #70, #71, and #72, with respective maximum plastic resin throughputs of 236, 320, 840, and 493 pounds per hour.
2) Replacement of injection molding machine #08 with a new unit with a maximum plastic resin throughput of 269 pounds per hour.
3) Replacement of the 3.3 million Btu per hour natural gas-fired boiler, with a new natural gas-fired boiler, having a maximum heat input capacity of 4.2 million Btu per hour, uncontrolled and exhausting outdoors.
4) Removal of the maintenance painting operation and two (2) 500-gallon above ground storage tanks (hydraulic oil and virgin solvent).
5) Removal of the requirements of 326 IAC 8-3 (i.e., Section D.1 of the MSOP) for the fifteen parts washers. These parts washers use diluted Mirachem M2750 as a solvent. This solvent is certified as a "Clean Air Solvent" by the South Coast Air Quality Management District. The certification is attached. IDEM already has a copy of the Safety Data Sheet for Mirachem M2750.
6) Renaming of the East Mold conveyance system to "70/71" from "72/73" and renaming of Thermoforming Machines IDs TFE #7-A, #14-A, #18-A, #31-A, and #32-A to #7, #14, #18, #31, and #32.
7) Addition of the following sources of negligible emissions: Fifteen (15) 3D printers used to make parts for research and development and equipment maintenance.

Please find attached to this correspondence the Cover Sheet and GSD-01 forms and emission calculations. If you have questions or comments, please do not hesitate to contact me directly at (317) 288-3891 or qbaig@corner-enviro.com.

Best regards,

Qaiser Baig
Sr. Environmental Engineer, PE

Attachments: Cover Sheet Form and GSD-01 Form, Emission Calculations, and CAS Certificate

cc: Cody Smith, Craig Stenz, Chris Leitsch, and Ghassan Dughaish, Berry Global

AIR PERMIT APPLICATION COVER SHEET

State Form 50639 (R4 / 1-10)
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

IDEM – Office of Air Quality – Permits Branch
100 N. Senate Avenue, MC 61-53 Room 1003
Indianapolis, IN 46204-2251
Telephone: (317) 233-0178 or
Toll Free: 1-800-451-6027 x30178 (within Indiana)
Facsimile Number: (317) 232-6749
www.IN.gov/idem

NOTES:

- The purpose of this cover sheet is to obtain the core information needed to process the air permit application. This cover sheet is required for all air permit applications submitted to IDEM, OAQ. Place this cover sheet on top of all subsequent forms and attachments that encompass your air permit application packet.
- Submit the completed air permit application packet, including all forms and attachments, to **IDEM Air Permits Administration** using the address in the upper right hand corner of this page.
- IDEM will send a bill to collect the filing fee and any other applicable fees.
- Detailed instructions for this form are available on the Air Permit Application Forms website.

FOR OFFICE USE ONLY

PERMIT NUMBER: 163-48006-00106

DATE APPLICATION WAS RECEIVED: Received State of Indiana JUN 25 2024 Dept of Environmental Mgmt Office of Air Quality

1. Tax ID Number: No longer required

PART A: Purpose of Application

Part A identifies the purpose of this air permit application. For the purposes of this form, the term "source" refers to the plant site as a whole and NOT to individual emissions units.

2. Source / Company Name: Berry Global, Inc. **3. Plant ID:** 163 – 0010

4. Billing Address: 101 Oakley Street

City: Evansville **State:** IN **ZIP Code:** 47710 –

5. Permit Level: ☐ Exemption ☐ Registration ☐ SSOA ☒ MSOP ☐ FESOP ☐ TVOP ☐ PBR

6. Application Summary: *Check all that apply. Multiple permit numbers may be assigned as needed based on the choices selected below.*

☐ Initial Permit ☐ Renewal of Operating Permit ☐ Asphalt General Permit
☐ Review Request ☐ Revocation of Operating Permit ☐ Alternate Emission Factor Request
☐ Interim Approval ☐ Relocation of Portable Source ☐ Acid Deposition (Phase II)
☐ Site Closure ☐ Emission Reduction Credit Registry

☐ Transition (between permit levels) *From:* *To:*

☒ Administrative Amendment: ☐ *Company Name Change* ☐ *Change of Responsible Official*
☐ *Correction to Non-Technical Information* ☐ *Notice Only Change*
☒ *Other (specify):* Exempt equipment changes

☐ Modification: ☐ *New Emission Unit or Control Device* ☐ *Modified Emission Unit or Control Device*
☐ *New Applicable Permit Requirement* ☐ *Change to Applicability of a Permit Requirement*
☐ *Prevention of Significant Deterioration* ☐ *Emission Offset* ☐ *MACT Preconstruction Review*
☐ *Minor Source Modification* ☐ *Significant Source Modification*
☐ *Minor Permit Modification* ☐ *Significant Permit Modification*
☐ *Other (specify):*

7. Is this an application for an initial construction and/or operating permit for a **"Greenfield" Source**? ☐ Yes ☒ No

8. Is this an application for construction of a new emissions unit at an **Existing Source**? ☐ Yes ☒ No

Continued on Next Page

PART B: Pre-Application Meeting

Part B specifies whether a meeting was held or is being requested to discuss the permit application.

9. Was a meeting held between the company and IDEM prior to submitting this application to discuss the details of the project?

☒ No ☐ Yes: *Date:*

10. Would you like to schedule a meeting with IDEM management and your permit writer to discuss the details of this project?

☒ No ☐ Yes: *Proposed Date for Meeting:*

PART C: Confidential Business Information

Part C identifies permit applications that require special care to ensure that confidential business information is kept separate from the public file.

Claims of confidentiality must be made at the time the information is submitted to IDEM, and must follow the requirements set out in the Indiana Administrative Code (IAC). To ensure that your information remains confidential, refer to the IDEM, OAQ information regarding submittal of confidential business information. For more information on confidentiality for certain types of business information, please review IDEM's Nonrule Policy Document Air-031-NPD regarding Emission Data.

11. Is any of the information contained within this application being claimed as **Confidential Business Information**?

☒ No ☐ Yes

PART D: Certification Of Truth, Accuracy, and Completeness

Part D is the official certification that the information contained within the air permit application packet is truthful, accurate, and complete. Any air permit application packet that we receive without a signed certification will be deemed incomplete and may result in denial of the permit.

For a Part 70 Operating Permit (TVOP) or a Source Specific Operating Agreement (SSOA), a "responsible official" as defined in 326 IAC 2-7-1(34) must certify the air permit application. For all other applicants, this person is an "authorized Individual" as defined in 326 IAC 2-1.1-1(1).

☒ *I certify under penalty of law that, based on information and belief formed after reasonable inquiry, the statements and information contained in this application are true, accurate, and complete.*

Brian Rose	Regional VP of Operations
Name *(typed)*	Title
Signature	6-24-24
	Date

OAQ GENERAL SOURCE DATA APPLICATION
GSD-01: Basic Source Level Information

State Form 50640 (R5 / 1-10)
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

CM-1

IDEM – Office of Air Quality – Permits Branch
100 N. Senate Avenue, MC 61-53 Room 1003
Indianapolis, IN 46204-2251
Telephone: (317) 233-0178 or
Toll Free: 1-800-451-6027 x30178 (within Indiana)
Facsimile Number: (317) 232-6749
www.IN.gov/idem

NOTES:

- The purpose of GSD-01 is to provide essential information about the entire source of air pollutant emissions. GSD-01 is a required form.
- Detailed instructions for this form are available on the Air Permit Application Forms website.
- All information submitted to IDEM will be made available to the public unless it is submitted under a claim of confidentiality. Claims of confidentiality must be made at the time the information is submitted to IDEM, and must follow the requirements set out in 326 IAC 17.1-4-1. Failure to follow these requirements exactly will result in your information becoming a public record, available for public inspection.

PART A: Source / Company Location Information

1. **Source / Company Name**: Berry Global, Inc. | 2. **Plant ID**: 163 – 00106
3. **Location Address**: 101 Oakley Street
   City: Evansville | **State**: IN | **ZIP Code**: 47710 –
4. **County Name**: Vanderburgh | 5. **Township Name**: Pigeon
6. **Geographic Coordinates**:
   Latitude: 37.97866 | **Longitude**: 87.57274
7. **Universal Transferal Mercadum Coordinates** *(if known)*:
   Zone: | **Horizontal**: | **Vertical**:
8. **Adjacent States**: Is the source located within 50 miles of an adjacent state?
   ☐ No ☒ Yes – *Indicate Adjacent State(s):* ☒ Illinois (IL) ☐ Michigan (MI) ☐ Ohio (OH) ☒ Kentucky (KY)
9. **Attainment Area Designation**: Is the source located within a non-attainment area for any of the criteria air pollutants?
   ☒ No ☐ Yes – *Indicate Nonattainment Pollutant(s):* ☐ CO ☐ Pb ☐ NO_x ☐ O_3 ☐ PM ☐ PM_{10} ☐ $PM_{2.5}$ ☐ SO_2
10. **Portable / Stationary**: Is this a portable or stationary source? ☐ Portable ☒ Stationary

PART B: Source Summary

11. **Company Internet Address** *(optional)*:
12. **Company Name History**: Has this source operated under any other name(s)?
    ☐ No ☒ Yes – *Provide information regarding past company names in Part I, Company Name History.*
13. **Portable Source Location History**: Will the location of the portable source be changing in the near future?
    ☒ Not Applicable ☐ No ☐ Yes – *Complete Part J, Portable Source Location History, and Part K, Request to Change Location of Portable Source.*
14. **Existing Approvals**: Have any exemptions, registrations, or permits been issued to this source?
    ☐ No ☒ Yes – *List these permits and their corresponding emissions units in Part M, Existing Approvals.*
15. **Unpermitted Emissions Units**: Does this source have any unpermitted emissions units?
    ☒ No ☐ Yes – *List all unpermitted emissions units in Part N, Unpermitted Emissions Units.*
16. **New Source Review**: Is this source proposing to construct or modify any emissions units?
    ☐ No ☒ Yes – *List all proposed new construction in Part O, New or Modified Emissions Units.*
17. **Risk Management Plan**: Has this source submitted a Risk Management Plan?
    ☒ Not Required ☐ No ☐ Yes → Date submitted: EPA Facility Identifier: – –

Continued on Next Page

PART C: Source Contact Information

IDEM will send the original, signed permit decision to the person identified in this section. This person MUST be an employee of the permitted source.

18. Name of Source Contact Person: Cody Smith		
19. Title *(optional)*: EHS Manager		
20. Mailing Address: 101 Oakley Street		
City: Evansville	**State**: IN	**ZIP Code**: 47710 –
21. Electronic Mail Address *(optional)*: codysmith@berryglobal.com		
22. Telephone Number: (812) 319 – 3376	**23. Facsimile Number** *(optional)*: (812) 492 – 9622	

PART D: Authorized Individual/Responsible Official Information

IDEM will send a copy of the permit decision to the person indicated in this section, if the Authorized Individual or Responsible Official is different from the Source Contact specified in Part C.

24. Name of Authorized Individual or Responsible Official: Brian Rose		
25. Title: Regional VP of Operations		
26. Mailing Address: 101 Oakley Street		
City: Evansville	**State**: IN	**ZIP Code**: 47710 –
27. Telephone Number: (812) 868 – 2405	**28. Facsimile Number** *(optional)*: ( ) –	

29. Request to Change the Authorized Individual or Responsible Official: Is the source officially requesting to change the person designated as the Authorized Individual or Responsible Official in the official documents issued by IDEM, OAQ? *The permit may list the title of the Authorized Individual or Responsible Official in lieu of a specific name.*

☐ No ☒ Yes – ***Change Responsible Official to:*** Brian Rose

PART E: Owner Information

30. Company Name of Owner: Berry Global Group, Inc.		
31. Name of Owner Contact Person: Brian Rose		
32. Mailing Address: 101 Oakley Street		
City: Evansville	**State**: IN	**ZIP Code**: 47710 –
33. Telephone Number: (812) 868 – 2405	**34. Facsimile Number** *(optional)*: ( ) –	

34. Operator: Does the "Owner" company also operate the source to which this application applies?

☐ No – *Proceed to Part F below.* ☒ Yes – *Enter "SAME AS OWNER" on line 35 and proceed to Part G below.*

PART F: Operator Information

35. Company Name of Operator: SAME AS OWNER		
36. Name of Operator Contact Person:		
37. Mailing Address:		
City:	**State**:	**ZIP Code**: –
38. Telephone Number: ( ) –	**39. Facsimile Number** *(optional)*: ( ) –	

Continued on Next Page

PART G: Agent Information

40. Company Name of Agent: Cornerstone Environmental, Health and Safety, Inc.

41. Type of Agent: ☒ Environmental Consultant ☐ Attorney ☐ Other (specify):

42. Name of Agent Contact Person: Qaiser Baig

43. Mailing Address: 880 Lennox Court

City: Zionsville	**State**: IN	**ZIP Code**: 46077 –

44. Electronic Mail Address *(optional)*: qbaig@corner-enviro.com

45. Telephone Number: (317) 288 – 3891	**46. Facsimile Number** *(optional)*: ( ) –

47. Request for Follow-up: Does the "Agent" wish to receive a copy of the preliminary findings during the public notice period (if applicable) and a copy of the final determination? ☐ No ☒ Yes

PART H: Local Library Information

48. Date application packet was filed with the local library: N/A - Administrative Amendment

49. Name of Library: Willard Library

50. Name of Librarian *(optional)*:

51. Mailing Address: 21 First Avenue

City: Evansville	**State**: IN	**ZIP Code**: 47710 –

52. Internet Address *(optional)*: willard.lib.in.us

53. Electronic Mail Address *(optional)*: willard@willard.lib.in.us

54. Telephone Number: (812) 425 – 4309	**55. Facsimile Number** *(optional)*: ( ) –

PART I: Company Name History *(if applicable)*

Complete this section only if the source has previously operated under a legal name that is different from the name listed above in Section A.

56. Legal Name of Company	**57. Dates of Use**
Berry Plastics Corporation	2001 to 2017
Berry Global, Inc.	2017 to
	to
	to
	to
	to
	to
	to
	to
	to

58. Company Name Change Request: Is the source officially requesting to change the legal name that will be printed on all official documents issued by IDEM, OAQ?

☒ No ☐ Yes – ***Change Company Name to:***

Continued on Next Page

PART J: Portable Source Location History *(if applicable)*

Complete this section only if the source is portable and the location has changed since the previous permit was issued. The current location of the source should be listed in Section A.

59. Plant ID	60. Location of the Portable Source	61. Dates at this Location
–		to
–		to
–		to
–		to
–		to
–		to
–		to
–		to
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–		to
–		to
–		to
–		to

PART K: Request to Change Location of Portable Source *(if applicable)*

Complete this section to request a change of location for a portable source.

62. Current Location:

Address:

City:	**State:**	**ZIP Code:** –

County Name:

63. New Location:

Address:

City:	**State:**	**ZIP Code:** –

County Name:

Continued on Next Page

PART L: Source Process Description

Complete this section to summarize the main processes at the source.

64. Process Description	65. Products	66. SIC Code	67. NAICS Code
Plastic Product Manufacturing	Plastic Products	3089	326121

PART M: Existing Approvals *(if applicable)*

Complete this section to summarize the approvals issued to the source since issuance of the main operating permit.

68. Permit ID	69. Emissions Unit IDs	70. Expiration Date
	See attached list	11/9/2027

PART N: Unpermitted Emissions Units *(if applicable)*

Complete this section only if the source has emission units that are not listed in any permit issued by IDEM, OAQ.

71. Emissions Unit ID	72. Type of Emissions Unit	73. Actual Dates		
		Began Construction	Completed Construction	Began Operation

PART O: New or Modified Emissions Units *(if applicable)*

Complete this section only if the source is proposing to add new emission units or modify existing emission units.

74. Emissions Unit ID	75. NEW	76. MOD	77. Type of Emissions Unit	78. Estimated Dates		
				Begin Construction	Complete Construction	Begin Operation
			See cover letter			

Permit #	Permit Type	Sub-Type	Permit Status	Status Date
163-46976-00106	MSOP AA/Revision/Other	MSOP Administrative Amendment	Issued	09/20/2023
163-46388-00106	MSOP AA/Revision/Other	MSOP Administrative Amendment	Issued	05/08/2023
163-44176-00106	MSOP AA/Revision/Other	MSOP Administrative Amendment	Issued	07/22/2021
163-40349-00106	MSOP AA/Revision/Other	MSOP Administrative Amendment	Issued	10/25/2018
163-39393-00106	MSOP AA/Revision/Other	MSOP Administrative Amendment	Issued	02/02/2018
163-38767-00106	MSOP Initial/Renewal	MSOP Renewal	Issued	11/09/2017

Clean Air Solvent Certificate

Mirachem, LLC

Product: Mirachem M2750 Cleaner/Degreaser

The South Coast Air Quality Management District hereby certifies the above product as a **Clean Air Solvent**.

South Coast AQMD

South Coast Air Quality Management District

December 13, 2021	December 13, 2026	
Date Issued	Expiration Date	Wayne Nastri Executive Officer

Clean Choices, Clean Air

Appendix A: Emissions Calculations
Injection Molding

Company Name: Berry Global, Inc.
Soure Address: 101 Oakley Street, Evansville, Indiana 47710
Administrative Amendment No.: 163-ABCDE-00106
Reviewer: TO BE DETERMINED

						PM/PM10/PM2.5				VOC			Formaldehyde		Acrolein		Acetaldehyde		Proplonaldehyde	
Emission unit ID	Max throughput (lb/hr)	Resin Type	Grinding Emissions Factor (lb/10^6 lb)	Regrind (lb/hr at 5% maximum)	Emission factor (lb/10^6 lb)	PTE before control (lb/hr)	PTE before control (ton/yr)	control efficiency	PTE after control (ton/yr)	Emission factor (lb/10^6 lb)	PTE (lb/hr)	PTE (ton/yr)	Emission factor (lb/10^6 lb)	PTE (ton/yr)	Emission factor (lb/10^6 lb)	PTE (ton/yr)	Emission factor (lb/10^6 lb)	PTE (ton/yr)	Emission factor (lb/10^6 lb)	PTE (ton/yr)
#1	714	PP (Homopolymer)	148	35.7	150	0.11	0.49	98.0%	0.47	191	0.14	0.60	1.3	0.004	0.14	0.0004	0.53	0.002	3.31	0.010
#2	714	PP (Homopolymer)	148	35.7	150	0.11	0.49	98.0%	0.47	191	0.14	0.60	1.3	0.004	0.14	0.0004	0.53	0.002	3.31	0.010
#3	714	PP (Homopolymer)	148	35.7	150	0.11	0.49	98.0%	0.47	191	0.14	0.60	1.3	0.004	0.14	0.0004	0.53	0.002	3.31	0.010
#4	588	PP (Homopolymer)	148	29.4	150	0.09	0.41	98.0%	0.39	191	0.11	0.49	1.3	0.003	0.14	0.0004	0.53	0.001	3.31	0.009
#5	268.4	PP (Homopolymer)	148	13.42	150	0.04	0.19	98.0%	0.18	191	0.05	0.22	1.3	0.002	0.14	0.0002	0.53	0.001	3.31	0.004
#6	840	PP (Homopolymer)	148	42	150	0.13	0.58	98.0%	0.552	191	0.16	0.70	1.3	0.005	0.14	0.0005	0.53	0.002	3.31	0.012
#8	269	PP (Homopolymer)	148	13.45	150	0.04	0.19	98.0%	0.177	191	0.05	0.23	1.3	0.002	0.14	0.0002	0.53	0.001	3.31	0.004
#9	840	PP (Homopolymer)	148	42	150	0.13	0.58	98.0%	0.552	191	0.16	0.70	1.3	0.005	0.14	0.0005	0.53	0.002	3.31	0.012
#10	504	PP (Homopolymer)	148	25.2	150	0.08	0.35	98.0%	0.33	191	0.10	0.42	1.3	0.003	0.14	0.0003	0.53	0.001	3.31	0.007
#11	504	PP (Homopolymer)	148	25.2	150	0.08	0.35	98.0%	0.33	191	0.10	0.42	1.3	0.003	0.14	0.0003	0.53	0.001	3.31	0.007
#12	374	PP (Homopolymer)	148	18.7	150	0.06	0.26	98.0%	0.25	191	0.07	0.31	1.3	0.002	0.14	0.0002	0.53	0.001	3.31	0.005
#13	714	PP (Homopolymer)	148	35.7	150	0.11	0.49	98.0%	0.47	191	0.14	0.60	1.3	0.004	0.14	0.0004	0.53	0.002	3.31	0.010
#14	420	PP (Homopolymer)	148	21	150	0.07	0.29	98.0%	0.28	191	0.08	0.35	1.3	0.002	0.14	0.0003	0.53	0.001	3.31	0.006
#15	672	PP (Homopolymer)	148	33.6	150	0.11	0.46	98.0%	0.44	191	0.13	0.56	1.3	0.004	0.14	0.0004	0.53	0.002	3.31	0.010
#16	588	PP (Copolymer)	148	29.4	34.5	0.02	0.11	98.0%	0.09	80.3	0.05	0.21	0.18	0.000	0.01	0.0000	0.2	0.001	0.95	0.002
#17	714	PP (Homopolymer)	148	35.7	150	0.11	0.49	98.0%	0.47	191	0.14	0.60	1.3	0.004	0.14	0.0004	0.53	0.002	3.31	0.010
#18	504	PP (Homopolymer)	148	25.2	150	0.08	0.35	98.0%	0.33	191	0.10	0.42	1.3	0.003	0.14	0.0003	0.53	0.001	3.31	0.007
#19	714	PP (Homopolymer)	148	35.7	150	0.11	0.49	98.0%	0.47	191	0.14	0.60	1.3	0.004	0.14	0.0004	0.53	0.002	3.31	0.010
#20	588	PP (Copolymer)	148	29.4	34.5	0.02	0.11	98.0%	0.09	80.3	0.05	0.21	0.18	0.0005	0.01	0.00003	0.2	0.0005	0.95	0.002
#22	1008	PP (Copolymer)	148	50.4	34.5	0.04	0.18	98.0%	0.15	80.3	0.08	0.35	0.18	0.0008	0.01	0.00004	0.2	0.0009	0.95	0.004
#23	1008	PP (Copolymer)	148	50.4	34.5	0.04	0.18	98.0%	0.15	80.3	0.08	0.35	0.18	0.0008	0.01	0.00004	0.2	0.0009	0.95	0.004
#24	388	PP (Copolymer)	148	19.4	34.5	0.02	0.07	98.0%	0.06	80.3	0.03	0.14	0.18	0.0003	0.01	0.00002	0.2	0.0003	0.95	0.002
#25	388	PP (Copolymer)	148	19.4	34.5	0.02	0.07	98.0%	0.06	80.3	0.03	0.14	0.18	0.0003	0.01	0.00002	0.2	0.0003	0.95	0.002
#26	1008	PP (Copolymer)	148	50.4	34.5	0.04	0.18	98.0%	0.15	80.3	0.08	0.35	0.18	0.0008	0.01	0.00004	0.2	0.0009	0.95	0.004
#28	1008	PP (Copolymer)	148	50.4	34.5	0.04	0.18	98.0%	0.15	80.3	0.08	0.35	0.18	0.0008	0.01	0.00004	0.2	0.0009	0.95	0.004
#32	756	PP (Homopolymer)	148	37.8	150	0.12	0.52	98.0%	0.50	191	0.14	0.63	1.3	0.004	0.14	0.0005	0.53	0.002	3.31	0.011
#33	840	PP (Homopolymer)	148	42	150	0.13	0.58	98.0%	0.552	191	0.16	0.70	1.3	0.005	0.14	0.0005	0.53	0.002	3.31	0.012
#34	840	PP (Homopolymer)	148	42	150	0.13	0.58	98.0%	0.55	191	0.16	0.70	1.3	0.005	0.14	0.0005	0.53	0.002	3.31	0.012
#35	714	PP (Homopolymer)	148	35.7	150	0.11	0.49	98.0%	0.47	191	0.14	0.60	1.3	0.004	0.14	0.0004	0.53	0.002	3.31	0.010
#37	840	PP (Copolymer)	148	42	34.5	0.04	0.15	98.0%	0.13	80.3	0.07	0.30	0.18	0.0007	0.01	0.00004	0.2	0.0007	0.95	0.003
#38	1302	PP (Copolymer)	148	65.1	34.5	0.05	0.24	98.0%	0.20	80.3	0.10	0.46	0.18	0.0010	0.01	0.00006	0.2	0.0011	0.95	0.005
#39	1176	PP (Copolymer)	148	58.8	34.5	0.05	0.22	98.0%	0.18	80.3	0.09	0.41	0.18	0.0009	0.01	0.00005	0.2	0.0010	0.95	0.005
#40	1176	PP (Copolymer)	148	58.8	34.5	0.05	0.22	98.0%	0.18	80.3	0.09	0.41	0.18	0.0009	0.01	0.00005	0.2	0.0010	0.95	0.005
#41	1176	PP (Copolymer)	148	58.8	34.5	0.05	0.22	98.0%	0.18	80.3	0.09	0.41	0.18	0.0009	0.01	0.00005	0.2	0.0010	0.95	0.005
#42	1176	PP (Copolymer)	148	58.8	34.5	0.05	0.22	98.0%	0.18	80.3	0.09	0.41	0.18	0.0009	0.01	0.00005	0.2	0.0010	0.95	0.005
#43	1176	PP (Copolymer)	148	58.8	34.5	0.05	0.22	98.0%	0.18	80.3	0.09	0.41	0.18	0.0009	0.01	0.00005	0.2	0.0010	0.95	0.005
#44	1176	PP (Copolymer)	148	58.8	34.5	0.05	0.22	98.0%	0.18	80.3	0.09	0.41	0.18	0.0009	0.01	0.00005	0.2	0.0010	0.95	0.005
#45	1176	PP (Homopolymer)	148	58.8	150	0.19	0.81	98.0%	0.77	191	0.22	0.98	1.3	0.007	0.14	0.0007	0.53	0.003	3.31	0.017
#46	1176	PP (Copolymer)	148	58.8	34.5	0.05	0.22	98.0%	0.18	80.3	0.09	0.41	0.18	0.0009	0.01	0.00005	0.2	0.0010	0.95	0.005
#47	1176	PP (Copolymer)	148	58.8	34.5	0.05	0.22	98.0%	0.18	80.3	0.09	0.41	0.18	0.0009	0.01	0.00005	0.2	0.0010	0.95	0.005
#48	1176	PP (Copolymer)	148	58.8	34.5	0.05	0.22	98.0%	0.18	80.3	0.09	0.41	0.18	0.0009	0.01	0.00005	0.2	0.0010	0.95	0.005
#49	1176	PP (Copolymer)	148	58.8	34.5	0.05	0.22	98.0%	0.18	80.3	0.09	0.41	0.18	0.0009	0.01	0.00005	0.2	0.0010	0.95	0.005
#50	1176	PP (Copolymer)	148	58.8	34.5	0.05	0.22	98.0%	0.18	80.3	0.09	0.41	0.18	0.0009	0.01	0.00005	0.2	0.0010	0.95	0.005
#51	1176	PP (Copolymer)	148	58.8	34.5	0.05	0.22	98.0%	0.18	80.3	0.09	0.41	0.18	0.0009	0.01	0.00005	0.2	0.0010	0.95	0.005
#52	1176	PP (Copolymer)	148	58.8	34.5	0.05	0.22	98.0%	0.18	80.3	0.09	0.41	0.18	0.0009	0.01	0.00005	0.2	0.0010	0.95	0.005
#53	1302	PP (Copolymer)	148	65.1	34.5	0.05	0.24	98.0%	0.20	80.3	0.10	0.46	0.18	0.0010	0.01	0.00006	0.2	0.0011	0.95	0.005
#55	840	PP (Copolymer)	148	42	34.5	0.04	0.15	98.0%	0.13	80.3	0.07	0.30	0.18	0.0007	0.01	0.00004	0.2	0.0007	0.95	0.003
#56	840	PP (Copolymer)	148	42	34.5	0.04	0.15	98.0%	0.13	80.3	0.07	0.30	0.18	0.0007	0.01	0.00004	0.2	0.0007	0.95	0.003
#57	1008	PP (Copolymer)	148	50.4	34.5	0.04	0.18	98.0%	0.15	80.3	0.08	0.35	0.18	0.0008	0.01	0.00004	0.2	0.0009	0.95	0.004
#58	550	PP (Copolymer)	148	27.5	34.5	0.02	0.10	98.0%	0.08	80.3	0.04	0.19	0.18	0.0004	0.01	0.00002	0.2	0.0005	0.95	0.002
#60	756	PP (Homopolymer)	148	37.8	150	0.12	0.52	98.0%	0.50	191	0.14	0.63	1.3	0.0043	0.14	0.00046	0.53	0.0018	3.31	0.011
#61	756	PP (Homopolymer)	148	37.8	150	0.12	0.52	98.0%	0.50	191	0.14	0.63	1.3	0.0043	0.14	0.00046	0.53	0.0018	3.31	0.011
#62	521	PP (Homopolymer)	148	26.05	150	0.08	0.36	98.0%	0.34	191	0.10	0.44	1.3	0.0030	0.14	0.00032	0.53	0.0012	3.31	0.008
#63	521	PP (Homopolymer)	148	26.05	150	0.08	0.36	98.0%	0.34	191	0.10	0.44	1.3	0.0030	0.14	0.00032	0.53	0.0012	3.31	0.008
#64	521	PP (Homopolymer)	148	26.05	150	0.08	0.36	98.0%	0.34	191	0.10	0.44	1.3	0.0030	0.14	0.00032	0.53	0.0012	3.31	0.008
#65	714	PP (Homopolymer)	148	35.7	150	0.11	0.49	98.0%	0.47	191	0.14	0.60	1.3	0.0041	0.14	0.00044	0.53	0.0017	3.31	0.010
#66	338.8	PP (Homopolymer)	148	16.94	150	0.05	0.23	98.0%	0.22	191	0.06	0.28	1.3	0.0019	0.14	0.00021	0.53	0.0008	3.31	0.005
#67	236	PP (Homopolymer)	148	11.8	150	0.04	0.16	98.0%	0.16	191	0.05	0.20	1.3	0.0013	0.14	0.00014	0.53	0.0005	3.31	0.003
#68	338.8	PP (Homopolymer)	148	16.94	150	0.05	0.23	98.0%	0.22	191	0.06	0.28	1.3	0.0019	0.14	0.00021	0.53	0.0008	3.31	0.005
#69	1350.8	PP (Homopolymer)	148	67.54	150	0.21	0.93	98.0%	0.89	191	0.26	1.13	1.3	0.0077	0.14	0.00083	0.53	0.0031	3.31	0.020
#70	320	PP (Homopolymer)	148	16	150	0.05	0.22	98.0%	0.21	191	0.06	0.27	1.3	0.0018	0.14	0.00020	0.53	0.0007	3.31	0.005
#71	840	PP (Homopolymer)	148	42	150	0.13	0.58	98.0%	0.55	191	0.16	0.70	1.3	0.0048	0.14	0.00052	0.53	0.0019	3.31	0.012
#72	493	PP (Homopolymer)	148	24.65	150	0.08	0.34	98.0%	0.32	191	0.09	0.41	1.3	0.0028	0.14	0.00030	0.53	0.0011	3.31	0.007
NESTAL*	428	PP (Homopolymer)	148	21.4	150	0.07	0.30	0.0%	0.30	191	0.08	0.36	1.3	0.0024	0.14	0.00026	0.53	0.0010	3.31	0.006
HUSKY*	87	PP (Homopolymer)	148	4.35	150	0.01	0.06	0.0%	0.06	191	0.02	0.07	1.3	0.0005	0.14	0.00005	0.53	0.0002	3.31	0.001
BMB*	300	PP (Homopolymer)	148	15	150	0.05	0.21	0.0%	0.21	191	0.06	0.25	1.3	0.0017	0.14	0.00018	0.53	0.0007	3.31	0.004
Totals:	50869					4.78	**20.93**	--		--	**6.62**	**29.00**	--	**0.15**	--	**0.02**	--	**0.08**	--	**0.45**
Total PTE before control for units with controls not considered as integral							**10.38**													
Total PTE after control for units with control considered integral									**9.13**											

Notes:
The cyclone dust collection system was determined to be integral in MSOP Renewal #163-22999-00106 for existing units. Therefore, PTE after control will be used for permit level determination for units highlighted in green, assuming 98% control efficiency.
These calculations have been updated based on information provided by the source in the application received on July 16, 2014 and using emission factors previously approved by IDEM.
Polypropylene (PP) emission factors are from Adams, K. et. al (January 1999) "Development of Emission Factors for Polypropylene Processing",
Journal of the Air & Waste Management Association, Vol. 49, pp 49-56.
Emission factors for copolymer used are for reactor impact copolymer with a melt temperature of 505°C in Table 5 of the paper.
Emission factors for homopolymer used are for controlled rheology homopolymer with a melt temperature of 490°C in Table 5 of the paper.
* The three (3) machines used for research and development (NESTAL, HUSKY, BMB) use no controls.

Methodology:
Uncontrolled PTE (lb/hr) = Max throughput (lb/hr)/10^6 * Emission factor (lb/10^6 lb)
Uncontrolled PTE (ton/yr) = PTE (lb/hr) * 8760 hr/yr * 1 ton/2000 lb
Controlled PM PTE (ton/yr) = ((Max throughput (lb/hr)/10^6 * Emission factor (lb/10^6 lb)) + (Regrind max throughput (lb/hr)/106 * Emission factor (lb/106 lb) * (1 - Control Efficiency))) * 8760 hr/yr * 1 ton/2,000 lb

Appendix A: Emissions Calculations
Emission Summary

Company Name: Berry Global, Inc.
Soure Address: 101 Oakley Street, Evansville, Indiana 47710
Administrative Amendment No.: 163-ABCDE-00106
Reviewer: TO BE DETERMINED

Unlimited Potential to Emit (tons/year)									
Emission Unit	**PM**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**NO_x**	**VOC**	**CO**	**Total HAPs**	**Single HAP**
Injection Molding with controls not considered as integral	10.38	10.38	10.38	--	--	29.00	--	0.69	0.45
Injection Molding with controls considered as integral*	9.13	9.13	9.13						
Thermoforming*	24.07	24.07	24.07	--	--	42.97	--	2.71	1.79
Extrusion	0.26	0.26	0.26	--	--	0.30	--	2.5E-03	--
Printing	--	--	--	--	--	5.74	--	0.00	--
Cleaning Solvents	--	--	--	--	--	16.29	--	1.17	--
~~Maintenance Painting~~				--	--		--		--
Natural Gas Combustion	0.09	0.37	0.37	0.03	4.87	0.27	4.09	0.09	--
Emergency Generator	0.06	0.06	0.06	0.05	0.83	0.07	0.18	7.3E-04	--
Material Handling**	4.52	2.00	2.00	--	--	--	--	--	--
Abrasive Blasting	0.02	4.6E-05	4.6E-05	--	--	--	--	--	--
Laser Stencil Cutter	1.3E-03	1.3E-03	1.3E-03	--	--	1.3E-03	--	--	--
Scrap Plastic Grinder/ Shredder (GR-1)	1.04	1.04	1.04	--	--	--	--	--	--
Six (6) Small Grinders***	0.50	0.50	0.50	--	--	--	--	--	--
Total PTE Excluding Fugitives	**50.07**	**47.80**	**47.80**	**0.08**	**5.70**	**94.63**	**4.27**	**4.67**	**2.23**
Paved Roads	13.69	2.74	0.67	--	--	--	--	--	--
Total PTE Including Fugitives	**63.76**	**50.54**	**48.47**	**0.08**	**5.70**	**94.63**	**4.27**	**4.67**	**2.23**

*PM, PM_{10}, and $PM_{2.5}$ control is considered integral to specific Injection Molding and Thermoforming equipment.
**PM, PM_{10}, and $PM_{2.5}$ control is considered integral to product separators/cyclones in the pneumatic conveyance lines. Therefore, PTE is after control for these units.
***These six (6) small grinders are only occasionally used to grind plastic scrap. The source claims that they have negligeable PM emissions and 0.5 tons per year is used as the worst case PM emissions.

Appendix A: Emissions Calculations
Extrusion

Company Name: Berry Global, Inc.
Soure Address: 101 Oakley Street, Evansville, Indiana 47710
Administrative Amendment No.: 163-ABCDE-00106
Reviewer: TO BE DETERMINED

			PM/PM10/PM2.5			VOC			Formaldehyde		Acrolein		Acetaldehyde		Propionaldehyde	
Emission unit ID	Max throughput (lb/hr)	Resin Type	Emission factor (lb/10^6 lb)	PTE (lb/hr)	PTE (ton/yr)	Emission factor (lb/10^6 lb)	PTE (lb/hr)	PTE (ton/yr)	Emission factor (lb/10^6 lb)	PTE (ton/yr)	Emission factor (lb/10^6 lb)	PTE (ton/yr)	Emission factor (lb/10^6 lb)	PTE (ton/yr)	Emission factor (lb/10^6 lb)	PTE (ton/yr)
A	508	LDPE	30.9	0.016	0.069	35.3	0.02	0.08	0.1	0.0002	0.01	0.00002	0.12	0.0003	0.07	0.00016
B	294	LDPE	30.9	0.009	0.040	35.3	0.01	0.05	0.1	0.0001	0.01	0.00001	0.12	0.0002	0.07	0.00009
C	294	LDPE	30.9	0.009	0.040	35.3	0.01	0.05	0.1	0.0001	0.01	0.00001	0.12	0.0002	0.07	0.00009
D	75	LDPE	30.9	0.002	0.010	35.3	0.00	0.01	0.1	0.0000	0.01	0.00000	0.12	0.0000	0.07	0.00002
E	60	LDPE	30.9	0.002	0.008	35.3	0.00	0.01	0.1	0.0000	0.01	0.00000	0.12	0.0000	0.07	0.00002
RD-A*	26	LDPE	30.9	0.001	0.004	35.3	0.00	0.00	0.1	0.0000	0.01	0.00000	0.12	0.0000	0.07	0.00001
RD-B*	154	LDPE	30.9	0.005	0.021	35.3	0.01	0.02	0.1	0.0001	0.01	0.00001	0.12	0.0001	0.07	0.00005
RD-C*	70	LDPE	30.9	0.002	0.009	35.3	0.00	0.01	0.1	0.0000	0.01	0.00000	0.12	0.0000	0.07	0.00002
RD-D*	36	LDPE	30.9	0.001	0.005	35.3	0.00	0.01	0.1	0.0000	0.01	0.00000	0.12	0.0000	0.07	0.00001
RD-E*	249	LDPE	30.9	0.008	0.034	35.3	0.01	0.04	0.1	0.0001	0.01	0.00001	0.12	0.0001	0.07	0.00008
COLOR*	100	LDPE	30.9	0.003	0.014	35.3	0.004	0.02	0.1	0.00004	0.01	0.000004	0.12	0.0001	0.07	0.00003
COLOR2*	50	LDPE	30.9	0.002	0.007	35.3	0.002	0.01	0.1	0.00002	0.01	0.000002	0.12	0.0000	0.07	0.00002
LAB Extruder1*	8	LDPE	30.9	0.000	0.001	35.3	0.000	0.00	0.1	0.00000	0.01	0.000000	0.12	0.00000	0.07	0.00000
		Totals:	**0.06**	**0.26**		**0.07**	**0.30**	**--**	**0.0008**	**--**	**0.0001**	**--**	**0.0010**	**--**	**0.0006**

Notes:
These calculations have been updated based on information provided by the source in the application received on July 16, 2014 and using emission factors previously approved by IDEM.
Low density polyethylene (LDPE) emission factors are from Barlow. et. al (June 1996) "Development of Emission Factors for Polyethylene Processing", Journal of the Air & Waste Management Association, Vol. 46, pp 569-580.
Emission factors used are for LDPE Extrusion Coating with a melt temperature of 500°C in Table 7 of the paper.
*These units are for Research & Development only and use no control device.

Methodology:
PTE (lb/hr) = Max throughput (lb/hr)/10^6 * Emission factor (lb/10^6 lb)
PTE (ton/yr) = PTE (lb/hr) * 8760 hr/yr * 1 ton/2000 lb
Controlled PTE (ton/yr) = PTE (ton/yr) * (1 - Control Efficiency)

Appendix A: Emissions Calculations
Thermoforming

Company Name: Berry Global, Inc.
Soure Address: 101 Oakley Street, Evansville, Indiana 47710
Administrative Amendment No.: 163-ABCDE-00106
Reviewer: TO BE DETERMINED

						PM/PM/PM2.5***				VOC			Formaldehyde		Acrolein		Acetaldehyde		Propionaldehyde		Ethyl Benzene		Styrene	
Emission unit ID	Max throughput (lb/hr)	Resin Type	Grinding Emission Factor (lb/10^6 lb)	Regrind (lb/hr at 60% maximum)	Extruder Emission factor (lb/10^6 lb)	PTE before control (lb/hr)	PTE before control (ton/yr)	control efficiency	PTE after control (ton/yr)	Emission factor (lb/10^6 lb)	PTE (lb/hr)	PTE (ton/yr)	Emission factor (lb/10^6 lb)	PTE (ton/yr)	Emission factor (lb/10^6 lb)	PTE (ton/yr)	Emission factor (lb/10^6 lb)	PTE (ton/yr)	Emission factor (lb/10^6 lb)	PTE (ton/yr)	Emission factor (lb/10^6 lb)	PTE (ton/yr)	Emission factor (lb/10^6 lb)	PTE (ton/yr)	Emission factor (lb/10^6 lb)	PTE (ton/yr)
TFE #1*	4,000	PP	148	2,400	34.5	0.49	2.16	98.0%	0.64	80.3	0.32	1.41	0.18	0.0032	0.01	0.00018	0.2	0.0035	0.95	0.017	--	--	--	--
TFE #2	6,000	PP	148	3,600	34.5	0.74	3.24	98.0%	0.95	80.3	0.48	2.11	0.18	0.0047	0.01	0.00026	0.2	0.0053	0.95	0.025	--	--	--	--
TFE #3	6,000	PP	148	3,600	34.5	0.74	3.24	98.0%	0.95	80.3	0.48	2.11	0.18	0.0047	0.01	0.00026	0.2	0.0053	0.95	0.025	--	--	--	--
TFE #4	6,000	PP	148	3,600	34.5	0.74	3.24	98.0%	0.95	80.3	0.48	2.11	0.18	0.0047	0.01	0.00026	0.2	0.0053	0.95	0.025	--	--	--	--
TFE #5	10,000	PP	148	6,000	34.5	1.23	5.40	98.0%	1.59	80.3	0.80	3.52	0.18	0.0079	0.01	0.00044	0.2	0.0088	0.95	0.042	--	--	--	--
TFE #6*	10,000	PP	148	6,000	34.5	1.23	5.40	98.0%	1.59	80.3	0.80	3.52	0.18	0.0079	0.01	0.00044	0.2	0.0088	0.95	0.042	--	--	--	--
TFE #7*	3,000	PS	148	1,800	65.1	0.46	2.02	98.0%	0.88	53.3	0.16	0.70	--	--	--	--	--	--	--	--	6.1	0.080	44.3	0.582
TFE #8*	1,800	PS	148	1,080	65.1	0.28	1.21	98.0%	0.53	53.3	0.10	0.42	--	--	--	--	--	--	--	--	6.1	0.048	44.3	0.349
TFE #9*	2,200	PS	148	1,320	65.1	0.34	1.48	98.0%	0.64	53.3	0.12	0.51	--	--	--	--	--	--	--	--	6.1	0.059	44.3	0.427
TFE #10*	6,000	PP	148	3,600	34.5	0.74	3.24	98.0%	0.95	80.3	0.48	2.11	0.18	0.0047	0.01	0.00026	0.2	0.0053	0.95	0.025	--	--	--	--
TFE #11*	4,500	PP	148	2,700	34.5	0.55	2.43	98.0%	0.71	80.3	0.36	1.58	0.18	0.0035	0.01	0.00020	0.2	0.0039	0.95	0.019	--	--	--	--
TFE #12*	4,500	PP	148	2,700	34.5	0.55	2.43	98.0%	0.71	80.3	0.36	1.58	0.18	0.0035	0.01	0.00020	0.2	0.0039	0.95	0.019	--	--	--	--
TFE #13*	4,500	PP	148	2,700	34.5	0.55	2.43	98.0%	0.71	80.3	0.36	1.58	0.18	0.0035	0.01	0.00020	0.2	0.0039	0.95	0.019	--	--	--	--
TFE #14*	2,500	PP	148	1,500	34.5	0.31	1.35	98.0%	0.40	80.3	0.20	0.88	0.18	0.0020	0.01	0.00011	0.2	0.0022	0.95	0.010	--	--	--	--
TFE #15*	10,600	PP	148	6,360	34.5	1.31	5.72	98.0%	1.68	80.3	0.85	3.73	0.18	0.0084	0.01	0.00046	0.2	0.0093	0.95	0.044	--	--	--	--
TFE #16	10,600	PP	148	6,360	34.5	1.31	5.72	98.0%	1.68	80.3	0.85	3.73	0.18	0.0084	0.01	0.00046	0.2	0.0093	0.95	0.044	--	--	--	--
TFE #17*	2,350	PP	148	1,410	34.5	0.29	1.27	98.0%	0.37	80.3	0.19	0.83	0.18	0.0019	0.01	0.00010	0.2	0.0021	0.95	0.010	--	--	--	--
TFE #18*	10,000	PP	148	6,000	34.5	1.23	5.40	98.0%	1.59	80.3	0.80	3.52	0.18	0.0079	0.01	0.00044	0.2	0.0088	0.95	0.042	--	--	--	--
TFE #19*	4,100	PP	148	2,460	34.5	0.51	2.21	98.0%	0.65	80.3	0.33	1.44	0.18	0.0032	0.01	0.00018	0.2	0.0036	0.95	0.017	--	--	--	--
TFE #20**	235	PP	148	141	34.5	0.03	0.13	0.0%	0.13	80.3	0.02	0.08	0.18	0.0002	0.01	0.00001	0.2	0.0002	0.95	0.001	--	--	--	--
TFE #21**	235	PP	148	141	34.5	0.03	0.13	0.0%	0.13	80.3	0.02	0.08	0.18	0.0002	0.01	0.00001	0.2	0.0002	0.95	0.001	--	--	--	--
TFE #22**	235	PP	148	141	34.5	0.03	0.13	0.0%	0.13	80.3	0.02	0.08	0.18	0.0002	0.01	0.00001	0.2	0.0002	0.95	0.001	--	--	--	--
TFE #30	2,200	PS	148	1,320	65.1	0.34	1.48	98.0%	0.64	53.3	0.12	0.51	--	--	--	--	--	--	--	--	6.1	0.059	44.3	0.427
TFE #31	4,000	PP	148	2,400	34.5	0.49	2.16	98.0%	0.64	80.3	0.32	1.41	0.18	0.0032	0.01	0.00018	0.2	0.0035	0.95	0.017	--	--	--	--
TFE #32	2,700	PP	148	1,620	34.5	0.33	1.46	98.0%	0.43	80.3	0.22	0.95	0.18	0.0021	0.01	0.00012	0.2	0.0024	0.95	0.011	--	--	--	--
TFE #33	4,000	PP	148	2,400	34.5	0.49	2.16	98.0%	0.64	80.3	0.32	1.41	0.18	0.0032	0.01	0.00018	0.2	0.0035	0.95	0.017	--	--	--	--
TFE #34	3,000	PP	148	1,800	34.5	0.37	1.62	98.0%	0.48	80.3	0.24	1.06	0.18	0.0024	0.01	0.00013	0.2	0.0026	0.95	0.012	--	--	--	--
Totals:	125,255					**15.73**	**68.88**	**--**	**21.40**	**--**	**9.81**	**42.97**	**--**	**0.09**	**--**	**0.005**	**--**	**0.10**	**--**	**0.48**	**--**	**0.25**	**--**	**1.79**

Notes:
These calculations have been updated based on information provided by the source in the application received on July 16, 2014 and using emission factors previously approved by IDEM.
Polypropylene (PP) emission factors are from Adams, K. et. al (January 1999) "Development of Emission Factors for Polypropylene Processing",
Journal of the Air & Waste Management Association, Vol. 49, pp 49-56. Emission factors used are for reactor impact copolymer with a melt temperature of 505°C in Table 5 of the paper.
Polystyrene (PS) emission factors are from Dow Chemical, et al., "Sampling and Analysis of Fumes Evolved During Thermal Processing of Polystyrene Resins"
as approved in FESOP #039-23280-00035 for Louisiana Pacific Operations and MSOP #035-30643-00078 for Spartech Polycom, Inc.
*The cyclone dust collection systems were determined to be integral in MSOP Renewal No. 163-22999-00106 for #1-#6; MSOP NOC No. 163-27114-00106 for #8, #10 and #13; MSOP NOC No. 163-30301-00106 for #9, #12, and #15-#17; MSOP AA No. 163-33117-00106 for #11 and #19; MSOP Renewal No. 163-38767-00106 for #31; MSOP AA No. 163-40349-00106 for #7-A, #14-A, #18-A, #31-A, and #32-A; and MSOP AA No. 163-46388-00106 for TFE #33
**TFE #20 and #21 are for Research & Development and do not use a control device.
***Only the PM emissions from regrind are controlled by the integral cyclone dust collection system. PM emissions from melting resin pellets during the extrusion process are uncontrolled.
Assumed PM=PM10=PM2.5

Methodology:
Uncontrolled PTE (lb/hr) = Max throughput (lb/hr)/10^6 * Emission factor (lb/10^6 lb)
Uncontrolled PTE (ton/yr) = PTE (lb/hr) * 8760 hr/yr * 1 ton/2000 lb
Controlled PM PTE (ton/yr) = ((Max throughput (lb/hr)/10^6 * Emission factor (lb/10^6 lb)) + (Regrind max throughput (lb/hr)/106 * Emission factor (lb/106 lb) * (1 - Control Efficiency))) * 8760 hr/yr * 1 ton/2,000 lb

Appendix A: Emissions Calculations
Cleaning solvents

Company Name: Berry Global, Inc.
Soure Address: 101 Oakley Street, Evansville, Indiana 47710
Administrative Amendment No.: 163-ABCDE-00106
Reviewer: TO BE DETERMINED

										Xylene		1,2,4 Trimethyl-benzene		Ethylbenzene	
Process	Emission unit ID	Solvent	Number of units	Max material usage, each (lb/hr)	Max material usage, total (lb/hr)	Weight % VOC	% Flash off	PTE of VOC (lb/hr)	PTE of VOC (ton/yr)	Weight %	PTE (ton/yr)	Weight %	PTE (ton/yr)	Weight %	PTE (ton/yr)
Parts washers	#1-15	Mirachem M2750	15	NA	0.47	1.00%	NA	0.0047	0.02	--	--	--	--	--	--
Existing injection-molding machine	#1-#57	BP627	57	0.05	2.85	100%	50%	1.43	6.24	26%	0.3705	24%	0.342	6%	0.0855
New injection-molding machine	#60-64	BP627	5	0.05	0.25	100%	50%	0.13	0.55	26%	0.0325	24%	0.030	6%	0.0075
Thermoformers	TFE #1-#6, #7-A, #8-#13, #14-A, #15-#17, #18-A, #19-#21, #30, #31-A, #32-A	BP627	24	0.045	1.08	100%	50%	0.54	2.37	26%	0.1404	24%	0.1296	6%	0.0324
Dry Offset UV cure ink printers	TPE19 - TPE21, TPE24 - TPE26, TPE28 - TPE30, TPE32 - TPE42	L-1919	19	0.3	5.7	50%	50%	1.43	6.24	--	--	--	--	--	-
UV cure ink Gallus printer line (WPRE01)	WPE01	Flexowash	1	0.29	0.29	0%	NA	--	--	--	--	--	--	--	-
UV cure ink Gallus printer line (WPRE02)	WPE02	Flexowash	1	0.29	0.29	0%	NA	--	--	--	--	--	--	--	-
Dry offset UV cure ink printers	TPE51	IPA	1	0.3	0.3	100%	50%	0.15	0.66	--	--	--	--	--	-
Dry offset UV cure ink printers	TPE85, TPE86, TPE87, TPE88	L-1919	4	0.01	0.04	100%	50%	0.02	0.09	--	--	--	--	--	--
Dry offset UV cure ink printers	TPE60 - TPE63, TPE65 - TPE68, TPE80 - TPE83	L-1919	12	0.01	0.12	50%	50%	0.03	0.13	--	--	--	--	--	--
							Total:	**3.72**	**16.29**	**--**	**0.54**	**--**	**0.50**	**--**	**0.13**

Notes:
As stated on page 15.4-18 of "Preferred and Alternative Methods for Estimating Air Emissions from the Printing, Packaging, and Graphic Arts Industry", May 2002, prepared by ERG for USEPA, emissions from solvent cleaning rags can be reduced by 50% if the spent rags are stored in closed containers.
Weight % VOC and HAPs from supplied by source from MSDS. Mirachem M2750 calculation for Weight % VOC = 100*(VOC diluted (10 g/L)*(1/density 0.997 g/cm3)*(.001 L/cm3) = 1.00%
Calculations updated in permit revision (#163-35784-00106) to reflect change in parts washers solvent use to Mirachem M2750.

Methodology:
Max material usage, total (lb/hr) = Max material usage, each (lb/hr) * Number of units
PTE of VOC (lb/hr) = Maximum in usage, total (lb/hr) * Weight % VOC * % Flash off
PTE of VOC (ton/yr) = PTE of VOC (lb/hr) * 8760 hrs/yr * 1 ton/2000 lbs
PTE of HAPs (ton/yr) = Maximum in usage, total (lb/hr) * Weight % HAP * % Flash off * 8760 hrs/yr * 1 ton/2000 lbs

Appendix A: Emissions Calculations
Printing

Company Name: **Berry Global, Inc.**
Soure Address: **101 Oakley Street, Evansville, Indiana 47710**
Administrative Amendment No.: **163-ABCDE-00106**
Reviewer: **TO BE DETERMINED**

										Xylene		Naphthalene		Ethylbenzene	
Type of printers	Emission unit ID	Ink	Number of units	Max ink usage,each (lb/hr)	Max ink usage, total (lb/hr)	Weight % VOC	% Flash off	PTE of VOC (lb/hr)	PTE of VOC (ton/yr)	Weight %	PTE (ton/yr)	Weight %	PTE (ton/yr)	Weight %	PTE (ton/yr)
Dry Offset UV cure ink printers	TPE19 - TPE21, TPE24 - TPE26, TPE28 - TPE30, TPE32 - TPE42	Sun Chemicals Energy Cured UV Ink INKCV5481170	20	NA	24.76	1%	100%	0.25	1.08	--	--	--	--	--	--
UV cure ink Gallus printer line	WPE01	Water Ink Technologies UV Curable Ink RVG001212	1	110.59	110.59	0%	100%	--	--	--	--	--	--	--	--
UV cure ink Gallus printer line	WPE02	Water Ink Technologies UV Curable Ink	1	18.91	18.91	1%	100%	0.19	0.83	--	--	--	--	--	--
Dry offset UV cure ink printers	TPE51	Sun Chemicals	1	0.125	0.125	1%	100%	0.001	0.005	--	--	--	--	--	--
Dry offset UV cure ink printers	TPE60 - TPE63, TPE65 - TPE68, TPE80 - TPE83	Sun Chemicals	12	0.02	0.24	1%	100%	0.002	0.011	--	--	--	--	--	--
Dry offset UV cure ink printers	TPE85, TPE86, TPE87, TPE88	Sun Chemicals	4	0.02	0.08	1%	100%	0.001	0.004	--	--	--	--	--	--
Inkjet Printer Ink	IMAJE#1, IMAJE#2, IMAJE#3, IMAJE#4, IMAJE#5	Markem Imaje 5513	5	0.054	0.27	75%	100%	0.201	0.879	--	--	--	--	--	--
Inkjet Printer Additive	IMAJE#1, IMAJE#2, IMAJE#3, IMAJE#4, IMAJE#5	Markem Imaje 5100	5	0.059	0.30	100%	100%	0.295	1.292	--	--	--	--	--	--
Inkjet Printer Cleanup	IMAJE#1, IMAJE#2, IMAJE#3, IMAJE#4, IMAJE#5	Markem Imaje 5181	5	0.075	0.37	100%	100%	0.374	1.636	--	--	--	--	--	--
							Total:	1.31	**5.74**	**--**	**--**	**--**	**--**	**--**	**--**

Notes:
These inks represent the worst-case VOC emissions
100% Flash off is assumed as worst-case.
Weight % VOC from supplied by source from MSDS. When <1%, 1% is assumed as worst case.
PA11 Polyall Extra or White is worst-case ink for HAPs for Silkscreen machines

Methodology:
Max ink usage, total (lb/hr) = Max ink usage, each (lb/hr) * Number of units
PTE of VOC (lb/hr) = Max ink usage, total (lb/hr) * Weight % VOC * % Flash off
PTE of VOC (ton/yr) = PTE of VOC (lb/hr) * 8760 hrs/yr * 1 ton/2000 lbs
PTE of HAPs (ton/yr) = Max ink usage, total (lb/hr) * Weight % HAP * % Flash off * 8760 hrs/yr * 1 ton/2000 lbs

Appendix A: Emissions Calculations
PM Emissions
Material Handling - Resin Unloading and Conveyance

Company Name: Berry Global, Inc.
Soure Address: 101 Oakley Street, Evansville, Indiana 47710
Administrative Amendment No.: 163-ABCDE-00106
Reviewer: TO BE DETERMINED

Resin Throughput (lbs/hr)	
Maximum hourly usage Injection Molding (lbs/hr)	50,869
Maximum hourly usage Thermoformers (lbs/hr)	125,255
Maximum hourly usage Extruders (lbs/hr)	1,906
Assume maximum throughput of resin silos to process lines (lbs/hr)	178,030

Silo[1] Loading from truck/railcar	Maximum Throughput (lbs/hr)	*PM Emission Factor (lb/ton)	*PM_{10} & $PM_{2.5}$ Emission Factor (lb/ton)	Uncontrolled PTE of PM (tons/yr)	Uncontrolled PM_{10}&$PM_{2.5}$ Emissions (ton/yr)	**PM Control Efficiency (%)	**PM_{10} Control Efficiency (%)	Controlled PTE of PM (tons/yr)	Controlled PTE of PM_{10} & $PM_{2.5}$ (tons/yr)
Blowing Systems 1 through 10[2]	178,030	0.029	0.006	11.31	2.50	80.00%	60.00%	2.26	1.00
			TOTAL	**11.31**	**2.50**	**--**	**--**	**2.26**	**0.998**

Methodology

Uncontrolled Emissions (ton/yr) = Throughput (lb/hr) * EF (lb/ton) * 1/2000 (ton/lb) * 8760 (hr/yr) * 1/2000 (ton/lb)
Controlled PM, PM_{10} Emissions (ton/yr) = Uncontrolled Emissions (ton/yr) * (1-% Control Efficiency)

*Emission Factors for PM & PM_{10} are from SCC code 30502503, sand and gravel material transportation and conveying. EF proposed by source. Assume PM_{10} = $PM_{2.5}$.

**Control efficiency proposed by source, taken from USEPA document EPA-452/F-03-005, Air Pollution Control Technology Fact Sheet for Cyclones

[1]Resin pellets are loaded through enclosed pneumatic systems from bulk transport (2 railcars and 3 truck stations) into the fifty-six (56) exterior and thirteen (13) interior storage silos.
Air is displaced from loading exits silos (via wire mesh filters on gooseneck pipes), so loading stations not separate source of emissions. Assume emissions negligible from silos since they are located downstream of integral product separator/cyclone.

[2]Blowing systems 1 through 10 include vacuum blower, integral product separator/cyclone, and baghouse (in-line filter).

Resin Conveying - Process Line Pneumatic Conveyors[1]	Maximum Throughput (lb/hr)	*PM Emission Factor (lb/ton)	*PM_{10} & $PM_{2.5}$ Emission Factor (lb/ton)	Uncontrolled PM Emissions (ton/yr)	Uncontrolled PM_{10}&$PM_{2.5}$ Emissions (ton/yr)	**PM Control Efficiency (%)[2]	**PM_{10} Control Efficiency (%)[2]	Controlled PM Emissions (ton/yr)	Controlled PTE of PM_{10} & $PM_{2.5}$ (tons/yr)
Pneumatic Conveyance Sysytems for Thermoforming	125,255	0.029	0.006	7.95	1.76	80.00%	60.00%	1.59	0.70
Pneumatic Conveyance Sysytems for Injection Molding	50,869	0.029	0.006	3.23	0.71	80.00%	60.00%	0.65	0.29
Pneumatic Conveyance Sysytems for Extrusion	1,906	0.029	0.006	0.12	0.03	80.00%	60.00%	0.02	0.01
			TOTAL	**11.31**	**2.50**	--	--	**2.26**	**0.998**

Methodology

Uncontrolled Emissions (ton/yr) = Throughput (lb/hr) * EF (lb/ton) * 1/2000 (ton/lb) * 8760 (hr/yr) * 1/2000 (ton/lb)
Controlled PM, PM_{10} Emissions (ton/yr) = Uncontrolled Emissions (ton/yr) * (1-% Control Efficiency)

*Emission Factors for PM & PM_{10} are from SCC code 30502503, sand and gravel material transportation and conveying. EF proposed by source. Assume PM_{10} = $PM_{2.5}$.

**Control efficiency proposed by source, taken from USEPA document EPA-452/F-03-005, Air Pollution Control Technology Fact Sheet for Cyclones

[1]Pneumatic conveyance systems for process lines include vacuum blower, integral product separator/cyclone, and baghouse (in-line filter) . PTE for intermediate storage bin loading accounted for by using maximum process line throughput in calculations.

2 The product separator (cyclones) were determined to be integral in revision #163-35784-00106.

Appendix A: Emissions Calculations
Natural Gas Combustion Only
MM BTU/HR <100

Company Name: Berry Global, Inc.
Soure Address: 101 Oakley Street, Evansville, Indiana 47710
Administrative Amendment No.: 163-ABCDE-00106
Reviewer: TO BE DETERMINED

Emission unit	Number of units	Heat Input Capacity (MMBtu/hr/unit)	Total Heat Input Capacity (MMBtu/hr)
~~Hurst 100 HP Boiler~~	~~1~~	~~3.30~~	~~3.30~~
20 HP Corporate Boilers (#1 and #2)	2	0.60	1.20
NEW BOILER	1	4.20	4.20
Instant Sink HW Heater1	1	0.20	0.20
Instant Sink HW Heater2	1	0.40	0.40
Thermo Maint HW Heater	1	0.04	0.04
Various small units	53	0.100	5.30
TOTAL	**60**	**5.54**	**11.34**

Heat Input Capacity MMBtu/hr	HHV mmBtu / mmscf	Potential Throughput MMCF/yr
11.3	1020	97.4

	Pollutant						
	PM*	**PM10***	**direct PM2.5***	**SO2**	**NOx**	**VOC**	**CO**
Emission Factor in lb/MMCF	1.9	7.6	7.6	0.6	100 **see below	5.5	84
Potential Emission in tons/yr	**0.09**	**0.37**	**0.37**	**0.03**	**4.87**	**0.27**	**4.09**

*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combined.
PM2.5 emission factor is filterable and condensable PM2.5 combined.
**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recirculation = 32

Methodology
All emission factors are based on normal firing.
MMBtu = 1,000,000 Btu
MMCF = 1,000,000 Cubic Feet of Gas
Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03
Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,020 MMBtu
Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

Hazardous Air Pollutants (HAPs)

	HAPs - Organics					
	Benzene	Dichlorobenzene	Formaldehyde	Hexane	Toluene	**Total - Organics**
Emission Factor in lb/MMcf	2.1E-03	1.2E-03	7.5E-02	1.8E+00	3.4E-03	
Potential Emission in tons/yr	**1.0E-04**	**5.8E-05**	**3.7E-03**	**0.09**	**1.7E-04**	**0.09**

	HAPs - Metals					
	Lead	Cadmium	Chromium	Manganese	Nickel	**Total - Metals**
Emission Factor in lb/MMcf	5.0E-04	1.1E-03	1.4E-03	3.8E-04	2.1E-03	
Potential Emission in tons/yr	2.4E-05	5.4E-05	6.8E-05	1.9E-05	1.0E-04	2.7E-04
					Total HAPs	**0.09**
					Worst HAP	**0.09**

Methodology is the same as above.
The five highest organic and metal HAPs emission factors are provided above.
Additional HAPs emission factors are available in AP-42, Chapter 1.4.

Appendix A: Emission Calculations
Abrasive Blasting - Confined

Company Name: Berry Global, Inc.
Soure Address: 101 Oakley Street, Evansville, Indiana 47710
Administrative Amendment No.: 163-ABCDE-00106
Reviewer: TO BE DETERMINED

Table 1 - Emission Factors for Abrasives

	Emission Factor (EF)	
Abrasive	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Glass Beads*	0.0023	0.0023

Potential to Emit Before Control

	Glass Beads	Walnut Shell	
FR = Flow rate of actual abrasive (lb/hr) =	1.0000	0.0002	lb/hr (per nozzle)
w = fraction of time of wet blasting =	0	0	%
N = number of nozzles =	2	1	
EF = PM emission factor for actual abrasive from Table 1 =	0.0023	0.010	lb PM/ lb abrasive
PM10 emission factor ratio for actual abrasive from Table 1 =	0.0023	0.70	lb PM10 / lb PM

	Glass Bead Blast Chambers			Walnut Shell Blast Chamber			
	PM	**PM10**	**PM2.5**	**PM**	**PM10**	**PM2.5**	
Potential to Emit (before control) =	4.6E-03	1.1E-05	1.1E-05	2.3E-06	5.3E-09	5.3E-09	**lb/hr**
=	1.1E-01	2.5E-04	2.5E-04	5.5E-05	1.3E-07	1.3E-07	**lb/day**
=	**2.0E-02**	**4.6E-05**	**4.6E-05**	**1.0E-05**	**2.3E-08**	**2.3E-08**	**ton/yr**

Total All Blast Chambers (Three Chambers)

	PM	PM10	PM2.5	
Potential to Emit (before control) =	4.60E-03	1.06E-05	1.06E-05	lb/hr
=	1.10E-01	2.54E-04	2.54E-04	lb/day
=	**2.02E-02**	**4.64E-05**	**4.64E-05**	**ton/yr**

Potential to Emit After Control

	PM	PM10	PM2.5	
Emission Control Device Efficiency =	**99.9%**	**99.9%**	**99.9%**	
Potential to Emit (after control) =	4.6E-06	1.1E-08	1.1E-08	lb/hr
=	1.1E-04	2.5E-07	2.5E-07	lb/day
=	**2.0E-05**	**4.6E-08**	**4.6E-08**	**ton/yr**

Methodology
PM2.5 emissions assumed equal to PM10 emissions.
Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
*Glass beads emission factors from AP-42 Section 13.2.6 Abrasive Blasting, Table 4-2.
Potential to Emit (before control) = EF x FR x (1 - w/200) x N (where w should be entered in as a whole number (if w is 50%, enter 50))
Potential to Emit (after control) = [Potential to Emit (before control)] * [1 - control efficiency]
Potential to Emit (tons/year) = [Potential to Emit (lbs/hour)] x [8760 hours/year] x [ton/2000 lbs]

Appendix A: Emergency Generator Emission Calculations
Reciprocating Internal Combustion Engines - Diesel Fuel
Output Rating (<=600 HP)
Maximum Input Rate (<=4.2 MMBtu/hr)

Company Name: Berry Global, Inc.
Soure Address: 101 Oakley Street, Evansville, Indiana 47710
Administrative Amendment No.: 163-ABCDE-00106
Reviewer: TO BE DETERMINED

Emissions calculated based on output rating (hp)

Output Horsepower Rating (hp)	107.2
Maximum Hours Operated per Year	500
Potential Throughput (hp-hr/yr)	53,600

	Pollutant						
	PM*	**PM10***	**direct PM2.5***	**SO2**	**NOx**	**VOC**	**CO**
Emission Factor in lb/hp-hr	0.0022	0.0022	0.0022	0.0021	0.0310	0.0025	0.0067
Potential Emission in tons/yr	**0.06**	**0.06**	**0.06**	**0.05**	**0.83**	**0.07**	**0.18**

*PM and PM2.5 emission factors are assumed to be equivalent to PM10 emission factors. No information was given regarding which method was used to determine the factor or the fraction of PM10 which is condensable.

Hazardous Air Pollutants (HAPs)

	Pollutant							
	Benzene	Toluene	Xylene	1,3-Butadiene	Formaldehyde	Acetaldehyde	Acrolein	Total PAH HAPs***
Emission Factor in lb/hp-hr****	6.53E-06	2.86E-06	2.00E-06	2.74E-07	8.26E-06	5.37E-06	6.48E-07	1.18E-06
Potential Emission in tons/yr	**1.75E-04**	**7.67E-05**	**5.35E-05**	**7.34E-06**	**2.21E-04**	**1.44E-04**	**1.74E-05**	**3.15E-05**

***PAH = Polyaromatic Hydrocarbon (PAHs are considered HAPs, since they are considered Polycyclic Organic Matter)
****Emission factors in lb/hp-hr were calculated using emission factors in lb/MMBtu and a brake specific fuel consumption of 7,000 Btu / hp-hr (AP-42 Table 3.3-1).

Potential Emission of Total HAPs (tons/yr)	**7.27E-04**

Methodology
Emission Factors are from AP 42 (Supplement B 10/96) Tables 3.4-1 , 3.4-2, 3.4-3, and 3.4-4.
Potential Throughput (hp-hr/yr) = [Output Horsepower Rating (hp)] * [Maximum Hours Operated per Year]
Potential Emission (tons/yr) = [Potential Throughput (hp-hr/yr)] * [Emission Factor (lb/hp-hr)] / [2,000 lb/ton]

Output Horsepower Rating (HP) approximated by using coversion of 1KW=1.34 HP

Appendix A: Emission Calculations
Laser Stencil Cutting

Company Name: Berry Global, Inc.
Soure Address: 101 Oakley Street, Evansville, Indiana 47710
Administrative Amendment No.: 163-ABCDE-00106
Reviewer: TO BE DETERMINED

Laser Cutting of Stencils
Full Spectrum Pro-Series 36X24 Model

Uncontrolled Emissions			
VOC lb/day	PM lb/day	VOC ton/yr	PM ton/yr
0.01	7.22E-03	1.30E-03	1.30E-03

Methodology
PM = PM10 = PM2.5
VOC lb/day = Daily gram melted (g) / (453.6 g/ 1 lb)
PM lb/day = Daily gram melted (g) / (453.6 g/ 1 lb)
VOC ton/yr = (Annual gram melted (g) / 453.6 g/ 1 lb) / (2,000 lb/ton)
PM ton/yr = (Annual gram melted (g) / 453.6 g/ 1 lb) / (2,000 lb/ton)

Laser Vaporization of Polypropylene generates about 50% gas and 50% particulate
The calculation is based on 100% of the material cut by the laser being converted to VOC and PM emissions.

Based on Polypropylene Stencil Cutting (density of material is polypropylene)

Width of cut (cm)	Thickness (cm)	Daily Length Cut (cm)**	Annual Length Cut (cm)	Density of material (g/cm3)	Daily gram melted	Annual gram melted
0.02	0.05	3,600	1,296,000	0.91	3.276	1179.36

Assumptions

0.5 mm	maximum stencil material thickness
0.1 to 0.2 mm	kerf width for laser cut
100 mm3	volume per meter cut at 0.2 mm kerf width and 0.5 mm thickness
0.91 g/cm3	density of polypropylene
0.091 gm	amount of material laser vaporizes per meter of cutting

Methodology
Daily Length Cut (cm) = 100cm * (1080 m/month) / (30 days/month)
Annual Length Cut (cm) = 100cm * (1080 m/month) * 12 months
Daily gram melted (g) = Width of cut (cm) * Thickness (cm) * Daily Length Cut (cm) * Density of material (g/cm3)
Annual gram melted (g) = Width of cut (cm) * Thickness (cm) * Annual Length Cut (cm) * Density of material (g/cm3)

**Actual cutting expected to be 360 meters per month, tripled to acount for 3 shifts is 1080 meters/month of material cut.
NOTE: The width and depth of the cut is called the "kerf". For Berry the maximum thickness of stencil material is 0.5 mm and the cut width is 0.2 mm. All units are converted to centimeters for calculation.

Appendix A: Emissions Calculations
Maintenance Paint Spray Cabinet

Company Name: **Berry Global, Inc.**
Soure Address: **101 Oakley Street, Evansville, Indiana 47710**
Administrative Amendment No.: **163-ABCDE-00106**
Reviewer: **TO BE DETERMINED**

Machine parts are sprayed for maintenance purposes in a spray cabinet
Cabinet dimensions are 32" x 60" x 52" and will vent inside the plant 12 ' above plant floor

Worst case emission scenario is one 20-ounce can being sprayed in a day.

Density:	6.29	lb/gal
Worst case VOC content:	69%	
Worst case total HAP content:	15.00%	
Worst case single HAP content:	10.00%	(Xylene- Mixed Isomers)
Worst case solids content:	22.50%	
Worst case transfer efficiency:	30.00%	
Worst case usage:	0.20	gal/day
	72.55	gal/year
	1.25	lbs/day
	456.3	lbs/year
Worst case VOC emissions:	314.8	lbs/year
	0.157	**tons/year**
Worst case total HAP emissions:	68.4	lbs/year
	0.034	**tons/year**
Worst case single HAP emissions:	45.6	lbs/year
	0.023	**tons/year**
Worst case PM emissions:	71.9	lbs/year
	0.04	**tons/year**

Worst case VOC content is based on subtracting lowest concentrations of non-VOC materials from 100%
Worst case HAP content is based on maximum concentrations of organic HAP compounds
Worst case solids content is based on maximum concentrations of solid compounds
Annual usage is based on 365 days of operation
HAP or VOC emissions = HAP or VOC weight percent x annual usage
PM emissions = solids weight percent x annual usage x (1 - transfer efficiency)

Appendix A: Emission Calculations
Fugitive Dust Emissions - Paved Roads

Company Name: Berry Global, Inc.
Soure Address: 101 Oakley Street, Evansville, Indiana 47710
Administrative Amendment No.: 163-ABCDE-00106
Reviewer: TO BE DETERMINED

Paved Roads at Industrial Site
The following calculations determine the amount of emissions created by paved roads, based on 8,760 hours of use and AP-42, Ch 13.2.1 (1/2011).

Vehicle Information (provided by source)

Type	Maximum number of vehicles per day	Number of one-way trips per day per vehicle	Maximum trips per day (trip/day)	Maximum Weight Loaded (tons/trip)	Total Weight driven per day (ton/day)	Maximum one-way distance (feet/trip)	Maximum one-way distance (mi/trip)	Maximum one-way miles (miles/day)	Maximum one-way miles (miles/yr)
Vehicle (entering plant) (one-way trip)	250.0	1.0	250.0	50.0	12500.0	300	0.057	14.2	5184.7
Vehicle (leaving plant) (one-way trip)	250.0	1.0	250.0	12.0	3000.0	300	0.057	14.2	5184.7
		Totals	**500.0**	**--**	**15500.0**	**--**	**--**	**28.4**	**10369.3**

Note: Maximum Weight Loaded for vehicles leaving plant was revised from 50 tons/trip in permit revision application, to 12 tons/trip in NOD response June 18, 2015.

Average Vehicle Weight Per Trip =	31.0	tons/trip
Average Miles Per Trip =	0.06	miles/trip

Unmitigated Emission Factor, Ef = [k * (sL)^0.91 * (W)^1.02] (Equation 1 from AP-42 13.2.1)

	PM	PM10	PM2.5	
where k =	0.011	0.0022	0.00054	lb/VMT = particle size multiplier (AP-42 Table 13.2.1-1)
W =	31.0	31.0	31.0	tons = average vehicle weight (provided by source)
sL =	9.7	9.7	9.7	g/m^2 = silt loading value for paved roads at iron and steel production facilities - Table 13.2.1-3)

Taking natural mitigation due to precipitation into consideration, Mitigated Emission Factor, Eext = E * [1 - (p/4N)] (Equation 2 from AP-42 13.2.1)

Mitigated Emission Factor, Eext = Ef * [1 - (p/4N)]

where p =	125	days of rain greater than or equal to 0.01 inches (see Fig. 13.2.1-2)
N =	365	days per year

	PM	PM10	PM2.5	
Unmitigated Emission Factor, Ef =	2.888	0.578	0.1418	lb/mile
Mitigated Emission Factor, Eext =	2.640	0.528	0.1296	lb/mile

Process	Unmitigated PTE of PM (tons/yr)	Unmitigated PTE of PM10 (tons/yr)	Unmitigated PTE of PM2.5 (tons/yr)	Mitigated PTE of PM (tons/yr)	Mitigated PTE of PM10 (tons/yr)	Mitigated PTE of PM2.5 (tons/yr)
Vehicle (entering plant) (one-way trip)	7.49	1.50	0.37	6.84	1.37	0.34
Vehicle (leaving plant) (one-way trip)	7.49	1.50	0.37	6.84	1.37	0.34
Totals	14.97	2.99	0.73	**13.69**	**2.74**	**0.67**

Methodology

Total Weight driven per day (ton/day) = [Maximum Weight Loaded (tons/trip)] * [Maximum trips per day (trip/day)]
Maximum one-way distance (mi/trip) = [Maximum one-way distance (feet/trip) / [5280 ft/mile]
Maximum one-way miles (miles/day) = [Maximum trips per year (trip/day)] * [Maximum one-way distance (mi/trip)]
Average Vehicle Weight Per Trip (ton/trip) = SUM[Total Weight driven per day (ton/day)] / SUM[Maximum trips per day (trip/day)]
Average Miles Per Trip (miles/trip) = SUM[Maximum one-way miles (miles/day)] / SUM[Maximum trips per year (trip/day)]
Unmitigated PTE (tons/yr) = [Maximum one-way miles (miles/yr)] * [Unmitigated Emission Factor (lb/mile)] * (ton/2000 lbs)
Mitigated PTE (tons/yr) = [Maximum one-way miles (miles/yr)] * [Mitigated Emission Factor (lb/mile)] * (ton/2000 lbs)

Abbreviations

PM = Particulate Matter
PM10 = Particulate Matter (<10 um)
PM2.5 = Particle Matter (<2.5 um)
PTE = Potential to Emit

Appendix A: Emission Calculations
Scrap Plastic Grinder/ Shredder

Company Name: **Berry Global, Inc.**
Soure Address: **101 Oakley Street, Evansville, Indiana 47710**
Administrative Amendment No.: **163-ABCDE-00106**
Reviewer: **TO BE DETERMINED**

Emission Unit	*Maximum Throughput Rate (lbs/hr)	Maximum Throughput Rate (ton/hr)	**Uncontrolled PM/PM10/PM2.5 Emission Factor (lbs/million lbs)	**Uncontrolled PM/PM10/PM2.5 Emission Factor (lbs/ton)	Uncontrolled PTE PM/ PM10/PM2.5 (lbs/hr)	Uncontrolled PTE of PM/PM10/PM2.5 Emissions* (tons/yr)
Scrap Plastic Grinder/ Shredder (GR-1)	1,600.00	0.800	148	0.296	0.24	**1.04**

Notes and Methodology:
*The maximum throughput for the grinders was assumed to be 1% of the maximum throughput for the injection molding.
** PM factor is the same used for grinding on injection molding and thermoforming lines. Assume PM = PM10 = PM2.5.
Maximum Throughput (lb/hr) = Maximum Throughput (lb/hr)(Injection Molding)*1%
Emission Factor (lbs/ton) = Emission Factor (lbs/million lbs) * 2,000 lbs.ton / million lbs
Uncontrolled PTE (lbs/hr) = Maximum Throughput Rate (lbs/hr) x Emission Factor (lbs/ton)
Uncontrolled PTE (tons/yr) = Uncontrolled PTE (lbs/hr) x 8760 hrs/yr x 1 ton/2000 lbs

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