From: Michael Muzychenko
To: Dedek, Tessa M
Subject: RE: [EXT] IDEM OAQ Contact Information for Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Date: Tuesday, November 21, 2023 10:19:22 AM
Attachments: image001.png
image002.png
image003.png
image004.png
image005.png
image006.png
image007.png
1 2 10 WF Tire Buffer Comp Test Report.doc
1 5 10 Tire Blower Exhaust Eng M5 Results Summary.xlsx

Good morning,

I am afraid that I may have filled out the application improperly.

Here are the changes that were made:

- The gas water heater was replaced with an electric water heater. (2020)
- We replaced the cyclone that was originally on the permit with a direct blower system that blows the rubber dust into a truck trailer. The blower is still integral to the buffer so one will not run without the other. (The blower was installed in 2020)(Exhausts outdoors into a trailer that has filtered exhaust ports).
  - The throughput would not change. The buffers are the emissions units and those were not changed, just the blower system.
  - I have attached historical testing information for the similar blower system that we use in other locations.
- We replaced one of the electric, 25 tire curing chambers with a 26-tire curing chamber. (Constructed in 2023) (Exhausts indoors)
  - There are minor VOC and HAP emissions whenever the cure chamber is opened at the end of a batch. There are no PM emissions from this type of curing.
  - The total emissions from the new tire cure chamber is:
    - VOC's = (26 tires/batch) (3.5 lb. rubber/tire)/3 hr = 30.33 lb/hr cure; (1.29 x 10E-4) (8,736) (1 ton/2000) = 0.017 tons/yr VOC's, 1 chamber
    - HAP's = (26 tires/batch) (3.5 lb. rubber/tire)/3 hr = 30.33 lb/hr cure; (6.73 x 10E-5) (8,736) (1 ton/2000) = 0.009 tons/yr HAP's, 1 chamber

Thank you,

Mike

#Safest Operations

Mike Muzychenko, CSP

Environment, Health, & Safety Manager
Commercial Tire & Service Centers

From: Dedek, Tessa M <TDedek@idem.IN.gov>
Sent: Monday, November 13, 2023 4:41 PM
To: Michael Muzychenko <michael_muzychenko@goodyear.com>
Subject: [EXT] IDEM OAQ Contact Information for Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

WARNING: This is an **EXTERNAL** email. **THINK** before you open attachments, click links or respond. **USE** the Outlook button to **REPORT** suspicious email.

Dear Michael,

I am the permit writer assigned to the current application No. 051-47201-00047 for The Goodyear Tire & Rubber Company. I would like to extend to you my contact information so that we may have continued communication until your new permit is issued. Please keep this information at hand. It is common for questions to arise, and oftentimes, further clarification is needed during the permit review process.

Based on my preliminary review of the application, please provide the following information:

1. The application Cover Sheet form indicated a new emission unit or control device, but I'm not seeing it listed anywhere. Please provide the following for all new emission units:
   a. Type of emission unit
   b. Emission unit ID
   c. Construction year
   d. Maximum throughput (lb/hr)
   e. Please list all control devices, if any
   f. Exhaust location: indoors, outdoors, or stack ID
2. Please send the calculations for all new emission units. Additionally, please send updated calculations for the entire source. The application Cover Sheet form had the "MSOP" box checked for the permit level. Is that a mistake or are you requesting to transition to a Minor Source Operating Permit (MSOP)?

IDEM, OAQ will notify you when a draft permit has been submitted for public notice and/or when a final permit has been issued. As part of the notification, IDEM, OAQ will provide information on how to access the draft and/or final permit electronically on IDEM's website. If The Goodyear Tire & Rubber Company would prefer to receive paper copies of the entire draft and/or final permit, please let me know prior to the end of the applicant review period. If you prefer to receive paper copies of the entire permit, IDEM, OAQ will mail a paper copy of the draft permit and/or original signed final permit to the source contact. If you do not request to receive paper copies of the entire permit, IDEM, OAQ will only mail a paper copy of the original signed final permit signature page to the source contact.

Please feel free to contact me at any time if you have questions, concerns, or important information regarding your permit. For your convenience, my section chief (Heath Hartley) may be contacted at (317) 232-8217 of hhartley@idem.IN.gov.

Thank you in advance for your time and assistance. I look forward to working with you.

Sincerely,

IDEM
EST. 1986

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment
| | | | | www.idem.IN.gov

Help us improve!
IDEM values your feedback

COMPLIANCE TEST REPORT
TIRE BUFFER BLOWER RUBBER
COLLECTION SYSTEM
AT
WINGFOOT COMMERCIAL TIRE SYSTEMS, LLC

PREPARED FOR:

301 WINGFOOT COURT
BREMEN, GEORGIA 30110
(HARALSON COUNTY)

PREPARED BY:

ADVANCED INDUSTRIAL RESOURCES, INC.
3939 ROYAL DRIVE SUITE 224
KENNESAW, GEORGIA 30144

JANUARY 12-13, 2010

COMPLIANCE TEST REPORT
TIRE BUFFER BLOWER RUBBER
COLLECTION SYSTEM
AT
WINGFOOT COMMERCIAL TIRE SYSTEMS, LLC

PREPARED FOR:

301 WINGFOOT COURT
BREMEN, GEORGIA 30110
(HARALSON COUNTY)

PREPARED BY:

ADVANCED INDUSTRIAL RESOURCES, INC.
3939 ROYAL DRIVE SUITE 224
KENNESAW, GEORGIA 30144

PREPARED BY:

STEVEN HAIGH

JANUARY 12, 2010

TABLE OF CONTENTS

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 SUMMARY OF TEST PROGRAM

Wingfoot Commercial Tire Systems, LLC (Wingfoot) operates a retreaded tire manufacturing facility at 301 Wingfoot Court, Bremen, Georgia 30110, (Haralson County). A compliance test was conducted to determine particulate matter concentrations and rates from the Tire Buffer Blower Rubber Collection System which operates in the state of Georgia under Air Quality Permit No. 3011-143-0029-S-01-0.. The test was conducted on January 12-13, 2010.

The testing was conducted in order to determine compliance with applicable standards for pollutant emissions, in accordance with the facility's operating air permit, the Georgia Environmental Protection Agency, and as required by the *Code of Federal Regulations*, Title 40, Part 60 (40 CFR 60). Advanced Industrial Resources, Inc. (AIR) conducted all testing procedures.

1.2 KEY PERSONNEL

The key personnel who coordinated the test program and their telephone numbers are:

Tom Allmon, *Wingfoot Commercial Tire Systems, LLC*	479-788-6401
Chris Mead, *Wingfoot Commercial Tire Systems, LLC*	770-562-8283
Scott Wilson, *Advanced Industrial Resources, Inc.*	800-224-5007

2.0 PLANT AND SAMPLING LOCATION DESCRIPTIONS

2.1 PROCESS & CONTROL EQUIPMENT DESCRIPTION

The Tire Buffer Blower Rubber Collection System controls emissions from the retreaded tire manufacturing process.

2.2 SAMPLING LOCATION

The rubber collection trailer exhaust vent duct extension was temporarily installed to provide a suitable sample location for this initial testing and is rectangular with internal dimensions of 12.0 inches by 12.0 inches. The sampling location of the vent's temporary exhaust is located at 2.1 equivalent diameters downstream from the nearest upstream flow disturbance and 0.6 equivalent diameters upstream from the stack exhaust. The stack has two sampling ports parallel to one another in a horizontal plane along one wall of the stack. Twenty-four sampling points (twelve traverse points in each of the two sampling ports) were used for USEPA Methods 2-5 sampling, in accordance with USEPA Method 1 requirements

3.0 SUMMARY AND DISCUSSION OF TEST RESULTS

3.1 OBJECTIVES

The purpose of the test program was to determine particulate matter concentrations and emission rates from the Tire Buffer Blower Rubber Collection System. The buffed rubber particles are blown to and collected within an "18-wheeler" type trailer which is equipped with six separate vents fitted with fabric/metal mesh air filters. These vents prevent the trailer from being over-pressurized and the filters control particulate emissions from being vented to the atmosphere. One of the six vents was temporarily equipped with a square duct extension which contained two sample ports. The emissions from this single vent are assumed to be approximately one-sixth (1/6) of the total emissions from the trailer. Therefore, the determined emissions, calculated in pounds per hour and tons per year, were multiplied by a factor of six in order estimate the total particulate emissions from the trailer exhaust vents.

3.2 FIELD TEST CHANGES AND PROBLEMS

Testing was conducted in accordance with the Notification and Site-Specific Test Protocol that was submitted to Georgia EPD in advance of testing. No significant problems were encountered during testing that required deviation from the planned test protocol.

3.3 PRESENTATION OF TEST RESULTS

The facility permit limits established for the Tire Buffer Blower Rubber Collection System are as follows:

Permit Condition 2.3	Limits the facility wide PM emissions below 100 tons per year.
Permit Condition 2.6	Georgia Rule (e) – Particulate Emission from Manufacturing Processes

Georgia Rule (e) – Particulate Emission from Manufacturing Processes

The Permittee shall not cause, let, suffer, permit, or allow the rate of emission from any source, particulate matter in total quantities equal to or exceeding the rate calculated by the following equation:

[391-3-1-.02(2)(e)1(i)]

$E = 4.1\ P^{0.67}$; for process input weight rate up to and including 30 tons per hour.
$E = 55\ P^{0.11} - 40$; for process input weight rate above 30 tons per hour.

Where:
E = emission rate in pounds per hour;
P = process input weight rate in tons per hour.

The Tire Buffer Blower Rubber Collection System emissions from the single vent tested were determined to be 0.059 tons per year thus the emissions from the system as a whole (i.e. single vent emissions x 6) were determined to be **0.354 tons per year** which is **0.35% of the allowable limit** of 100 tons per year facility wide. Tons per year calculations are based on the facility's permitted annual operation of 8,736 hours per year. Additionally, the emissions from the single vent were determined to be 0.0135 pounds per hour thus the emissions from the system as a whole were determined to be **0.081 pounds per hour** which is **1.7%** of the calculated average production based limit (i.e. Georgia Rule (e)) of **4.88 pounds per hour**. Based upon these test results it may be concluded that Tire Buffer Blower Rubber Collection System is operating in compliance with the given particulate matter emissions standards, as required by the Georgia Environmental Protection Division (EPD) Air Quality Permit No. 3011-143-0029-S-01-0.

Emission rates are summarized and compared to permit limits in Table 3-1. Concentrations, mass rates, and results are presented in Appendix A. Reduced and tabulated data from the field-testing is included in Appendix B. The calculations and nomenclature used to reduce the data are presented in Appendix C. Actual raw field data sheets are presented in Appendix D. Laboratory reports and custody records are presented in Appendix E.

3.4 PROCESS MONITORING

All essential process monitoring equipment was operating properly and data was being recorded throughout the test periods. The tire throughput for each test period (90 min. each plus port change time and pause times) was determined to be 31, 27, and 49, respectively. Each tire prior to being processed through the tire buffer system, initially weighs 125 pounds. Thus the weight based input rates were determined to be 1.26, 1.10, and 1.54 tons per hour, respectively. Data is presented in Appendix G.

4.0 SAMPLING AND ANALYTICAL PROCEDURES

Performance testing was conducted according to the methodology in the *Title 40 Code of Federal Regulation*, Part 60, Appendix A as applicable to particulate matter emitting sources. Specifically, Method 1 was used for the qualification of the location of sampling ports and for the determination of the stack gas velocity and volumetric flow rate. Method 2 was used for the determination of the stack velocity and volumetric flow rate. Method 3 was used for the determination of the composition and dry molecular weight for effluent stack gas. Method 5 was used for the determination of particulate matter emissions from stationary sources. Particulate matter is withdrawn isokinetically from the source and collected on a glass fiber filter maintained at a temperature of 120 ± 14 ºC (248 ± 25 ºF) or such other temperature as specified by an applicable subpart of the standards or approved by the Administrator for a particular application. The particulate matter mass, which includes any material that condenses at or above the filtration temperature, is determined gravimetrically after the removal of uncombined water.

Prior to each test run for particulate matter emissions, the sampling line was cleaned with acetone, and a labeled pre-tared glass-fiber filter was placed in the filter holder. The first two impingers were loaded with 100 mL each of water; the last impinger was loaded with 200 g of indicating silica gel; and the train was reassembled. After each test run, the filter was recovered and stored in a labeled petri dish, and the filter holder was rinsed with acetone into a labeled sample bottle. The nozzle and probe liner were brushed and rinsed with acetone, and the rinsing was added to the same sample bottle. Finally, the moisture collected in the impingers was measured, and the spent silica gel was stored in a labeled container. The final fluid level in the wash sample bottle was marked prior to shipment. All recovered filters and sample bottle were kept in a closed sample box until final laboratory analysis.

Laboratory reports and custody records are presented in Appendix E.

5.0 QUALITY ASSURANCE ACTIVITIES

5.1 INTERNAL QUALITY ASSURANCE

The quality assurance/quality control (QA/QC) measures associated with the sampling and analysis procedures given in the noted EPA reference methodologies, in Subparts A of 40 *CFR* 60 and 40 *CFR 63*, and in the *EPA QA/QC Handbook*, Volume III (EPA 600/R-94/038c) were employed, as applicable. Such measures include, but are not limited to, the procedures detailed below.

5.1.1 SAMPLING TRAIN LEAK CHECKS

Determinations of the leakage rate of the Method 5 sampling train were made before and after each sampling run using the procedure detailed in Section 4.1.4 of EPA Method 5. Before the sampling run, after the sampling train had been assembled and probe and filter box temperatures had time enough to settle at their appropriate operating values, the probe nozzle will be plugged and the system was evacuated to a pressure of 15 inches of Hg below ambient pressure. The volumetric leakage rate was be measured by the dry gas meter over the course of one (1) minute. The leakage rate was less than 0.020 cfm for each run, thereby meeting the maximum allowable leakage rate.

After the sampling run, before the train was disassembled the probe nozzle was plugged and the system depressurized to a vacuum equal to or greater than the maximum value reached during the sampling run. The dry gas meter measured the volumetric leakage rate over the course of one (1) minute. The leakage rate was determined to be less than 0.020 cfm, thereby meeting the maximum allowable leakage rate.

The Type “S” Pitot tube assembly was also checked for leaks before and after sampling runs using the procedure in Section 3.1 of EPA Method 2. The impact opening of the Pitot tube was blown through until a pressure of at least 3 inches of water registered on the manometer. The impact opening was quickly plugged and held for at least 15 seconds, during which time the manometer reading held. The same operation was performed on the static pressure side of the Pitot tube, except suction was used to obtain the pressure differential.

5.1.2 PROBE NOZZLE DIAMETER CHECKS

Probe nozzles were calibrated before field testing by measuring the internal diameter of the nozzle entrance orifice along three different diameters. Each diameter was measured to the nearest 0.001 inch, and all measurements were averaged. The diameters were within the limit of acceptable variation of 0.004”.

5.1.3 PITOT TUBE FACE PLANE ALIGNMENT CHECK

Before field testing, each Type S Pitot tube was examined in order to verify that the face planes of the tube were properly aligned, per Method 2 of 40 *CFR* 60, Appendix A. The external tubing diameter and base-to-face plane distances were measured in order to verify the use of 0.84 as the baseline (isolated) pitot coefficient. At that time the entire probe assembly (i.e., the sampling probe, nozzle, thermocouple, and Pitot tube) was inspected in order to verify that its components met the interference-free alignment specifications given in EPA Method 2. Because the specifications were met, then the baseline pitot coefficient was used for the entire probe assembly.

After field testing, the face plane alignment of each Pitot tube was checked. No damage to the tube orifices was noted.

5.1.4 METERING SYSTEM CALIBRATION

Every three months each dry gas meter (DGM) console is calibrated at five orifice settings according to Method 5 of 40 *CFR* 60, Appendix A. From the calibration data, calculations of the values of Y_m and $\Delta H_@$ are made, and an average of each set of values is obtained. The limit of total variation of Y_m values is ± 0.02, and the limit for $\Delta H_@$ values is ± 0.20.

After field testing, the calibration of the DGM console was checked by performing three calibration runs at a single intermediate orifice setting that is representative of the range used during field-testing. Each DGM was within the limit of acceptable relative variation from Y_m of 5.0%.

5.1.5 TEMPERATURE GAUGE CALIBRATION

After field testing, the temperature measuring instruments on each sampling train was calibrated against standardized mercury-in-glass reference thermometers. Each indicated temperature was within the limit of acceptable variation between the absolute reference temperature and the absolute indicated temperature of 1.5%.

5.1.6 SAMPLE HANDLING AND CHAIN OF CUSTODY PROCEDURES

All samples were transported in a closed sample box, the security of which was the responsibility of the *AIR* Test Director, Mr. Derek Stephens. These samples were received, checked, and numbered by the Test Director and custody records were written. The *AIR* QA Director, Mr. Scott Gunnell, then again checked the integrity of the samples and their identification.

The samples collected during the test program were placed in shipping coolers with sufficient insulation to prevent breakage during shipping. All samples in a shipping container were listed on the chain-of-custody form enclosed in the shipping container. Once the samples were securely packaged, the container was sealed with tape and several custody seals were placed over the top edge so that the container could not be opened without breaking the custody seals.

All samples were processed by the laboratory within their allotted holding times. Completed chains-of-custody are included in Appendix E.

5.1.7 DATA REDUCTION CHECKS

AIR ran an independent check (using a validated computer program) of the calculations with predetermined data before the field test, and the *AIR* Team Leader conducted spot checks on-site to assure that data was being recorded accurately. After the test, *AIR* checked the data input to assure that the raw data had been transferred to the computer accurately. Flow rates, temperatures and moisture levels were relatively constant (variation <5%) during the three test runs, which indicates that data recording and Method 2 and 4 sampling and calculation errors are not likely.

5.2 EXTERNAL QUALITY ASSURANCE

5.2.1 TEST PROTOCOL EVALUATION

A Site-Specific Test Protocol was submitted to Georgia EPD in advance of testing, which provided regulatory personnel the opportunity to review and comment upon the test and quality assurance procedures used in conducting this testing.

5.2.2 ON-SITE TEST EVALUATION

A test schedule was submitted with the Site-Specific Test Protocol and Georgia EPD personnel were notified of all changes in the schedule. No tests were performed earlier than stated in the original schedule. Therefore, regulatory personnel were afforded the opportunity for on-site evaluation of all test procedures.

6.0 DATA QUALITY OBJECTIVES

The data quality objectives (DQOs) process is generally a seven-step iterative planning approach to ensure development of sampling designs for data collection activities that support decision making. The seven steps are as follows: (1) defining the problem; (2) stating decisions and alternative actions; (3) identifying inputs into the decision; (4) defining the study boundaries; (5) defining statistical parameters, specifying action levels, and developing action logic; (6) specifying acceptable error limits; and (7) selecting resource-effective sampling and analysis plan to meet the performance criteria. The first five steps are primarily focused on identifying qualitative criteria such as the type of data needed and defining how the data will be used. The sixth step defines quantitative criteria and the seventh step is used to develop a data collection design. In regards to emissions sampling, these steps have already been identified for typical monitoring parameters.

Monitoring methods presented in 40 *CFR* 60 Appendix A indicate the following regarding DQOs: Adherence to the requirements of this method will enhance the quality of the data obtained from air pollutant sampling methods. At a minimum, each method provides the following types of information: summary of method; equipment and supplies; reagents and standards; sample collection, preservation, storage, and transportation; quality control; calibration and standardization; analytical procedures, data analysis and calculations; and alternative procedures. These test methods have been specified and were followed in accordance with the Site-Specific Test Protocol submitted to the Georgia Environmental Protection Division to ensure that DQOs were met for this project.

APPENDIX A

TEST RESULTS

APPENDIX B

FIELD DATA REDUCTION

APPENDIX C

EXAMPLE CALCULATIONS

AND

NOMENCLATURE

EXAMPLE CALCULATIONS

$A_n = D_n^2 \pi / 4$

$A_s = D_s^2 \pi / 4$

$B_{ws} = V_{w(std)} / (V_{m(std)} + V_{w(std)})$

$c_{analyte} = (m_{analyte} / V_{m(std)})$ (35.31466 ft^3/m^3)

$`c_{analyte} = (m_{analyte} / V_{m(std)})$ (0.015432 gr/mg)

$c_{analyte} = `c_{analyte}\ MW_{analyte}$ / 24.04 l/mol

$CC = t_{0.975} (S_d / n^{1/2})$

$d = 1/n (\Sigma d_i)$

$DE = (E_{Inlet} - E_{Outlet}) / E_{,Inlet}$ x 100%

$E_{analyte} = (m_{analyte} / V_{m(std)})\ Q_{sd}$ (60 min/hr) ($2.2046\text{x}10^{-6}$ lb./mg)

$E_{analyte} = c_{analyte}\ Q_{sd}$ (60 min/hr) ($2.2046\text{x}10^{-6}$ lb./mg)

$I = 100\ T_s (K_3\ V_{lc} + Y_m\ V_m\ P_m / T_m) / (60\ \theta\ v_s\ P_s\ A_n)$

where K_3 = 0.002669 (in. Hg ft^3) / (mL °R)

$K_I = [(2.0084\text{x}10^7\ \Delta H_{@})\ A_n\ (1 - B_{ws})]^2\ (M_d / M_s)\ (T_m / T_s)\ (P_s / P_m)$

M_d = 0.44 (% CO_2) + 0.32 (% O_2) + 0.28 (% N_2 + % CO)

$M_s = M_d (1 - B_{ws}) + M_w B_{ws}$

P = Qsd / F-Factor x 60 x (20.9-O_2) / 20.9

$P_m = P_{bar} + \Delta H / 13.6$

$P_s = P_{bar} + p_g / 13.6$

$Q_a = (60\ s/min)\ v_s\ A_s$

$Q_{sd} = (60\ s/min)\ (1 - B_{ws})\ v_s\ A_s\ (T_{std} / T_s)\ (P_s / P_{std})$

RA = [Abs(d) + Abs(CC)]/RM

$S_d = [(\Sigma d_i^2 - (\Sigma di)^2/n)/(n-1)]^{1/2}$

$T_m = t_m + 460°$

$T_s = t_s + 460°$

$V_{m(std)} = V_m\ Y_m\ (T_{std} / T_m)\ (P_m / P_{std})$

$V_{w(std)} = (V_{lc}\ \rho_w\ R\ T_{std}) / (M_w\ P_{std})$

$v_s = K_p\ C_p\ [\Delta p]^{1/2}\ [T_s / (P_s\ M_s)]^{1/2}$

NOMENCLATURE

Symbol	Units	Description
Abs(x)	dimensionless	Absolute value of parameter x
A_n	ft^2	Area of the nozzle
A_s	ft^2	Area of the stack
B_{ws}	dimensionless	Volume proportion of water in the stack gas stream
C_p	dimensionless	Type S pitot tube coefficient
$c_{analyte}$	mg/dscm	Concentration of analyte in dry stack gas, standardized
$'c_{analyte}$	gr./dscf	Concentration of analyte in dry stack gas, standardized
$'c_{analyte}$	ppm	Concentration of analyte in dry stack gas, standardized
CC	dimensionless	One-tailed 2.5% error confidence coefficient
d	ppm	Arithmetic mean of differences
d_i	ppm	Difference between individual CEM and reference method concentration value
D_n	inches	Internal diameter of the nozzle at the entrance orifice
D_s	inches	Internal diameter of the stack at sampling location
DE	percent	Destruction efficiency
ΔH	inches H_2O	Average pressure differential across the meter orifice
$\Delta H_@$	inches H_2O	Orifice pressure differential that corresponds to 0.75 cfm of air at 68 °F and 29.92 inches of Hg
Δp	inches H_2O	Velocity head of stack gas
$E_{analyte}$	lb./hour	Emission rate of analyte, time basis
I	percent	Isokinetic sampling ratio expressed as percentage
K_I	dimensionless	K-factor, ratio of DH to DP, ideal
K_p	$ft[(lb/lb\text{-}mol)(in.\ Hg)]^{1/2}$	Type S pitot tube constant,
	$s[(°R)(in.\ H_2O)]^{1/2}$	= 85.49
L_p	cfm	Measured post-test leakage rate of the sampling train
M_d	lb./lb.-mole	Molecular weight of gas at the DGM
M_s	lb./lb.-mole	Molecular weight of gas at the stack

NOMENCLATURE

Symbol	Units	Description
M_w	lb./lb.-mole	Molecular weight of water,
		= 18.0
$m_{analyte}$	mg	Mass of analyte in the sample
n	dimensionless	Number of data points
P	MMBtu	Fuel firing rate
P_{bar}	inches Hg	Barometric pressure at measurement site
P_{input}	tons/hour	Process dry mass input rate
p_g	inches H_2O	Gauge (static) pressure of stack gas
P_m	inches Hg	Absolute pressure of meter gases
P_s	inches Hg	Absolute pressure of stack gases
P_{std}	inches Hg	Standard absolute pressure
		= 29.92
Q_a	cfm	Volumetric flow rate of actual stack gas
Q_{sd}	dscfm	Volumetric flow rate of dry stack gas, standardized
R	(in. Hg)(ft^3)	Ideal gas constant,
	(lb-mole)(°R)	= 21.85
RA	percent	Relative accuracy
RE	percent	Removal efficiency
RM	ppm	Average reference method concentration
r_w	lb/mL	Density of water,
		= 0.002201
r_a	g/mL	Density of acetone,
		= 0.7899
S_d	dimensionless	Standard deviation
T_m	°R	Absolute temperature of dry gas meter
T_s	°R	Absolute temperature of stack gas
T_{std}	°R	Standard absolute temperature,
		= 528
$t_{0.975}$	dimensionless	2.5 percent error t-value
t_m	°F	Temperature of DGM
t_s	°F	Temperature of stack gas
θ	minutes	Total sampling time

NOMENCLATURE

Symbol	Units	Description
V_{lc}	mL	Total volume of liquid collected
V_m	dcf	Volume of gas sample as measured by the DGM
$V_{m(std)}$	dscf	Volume of gas sample as measured by the DGM, standardized
$V_{w(std)}$	scf	Volume of water vapor in the gas sample, standardized
v_s	ft./sec	Velocity of stack gas
Y_m	dimensionless	DGM calibration coefficient
Y_c	dimensionless	DGM calibration check value
Y_w	dimensionless	Reference (wet) gas meter calibration coefficient
% CO_2	percent	Percent CO_2 by volume, dry basis
% O_2	percent	Percent O_2 by volume, dry basis
% N_2	percent	Percent N_2 by volume, dry basis

APPENDIX D

FIELD DATA SHEETS

APPENDIX E

LABORATORY REPORTS

AND

CUSTODY RECORDS

APPENDIX F

CALIBRATION DATA

APPENDIX G

PROCESS OPERATION DATA

Advanced Industrial Resources, Inc

Wingfoot Commercial Tire System, LLC, Bremen, Georgia

TABLE 3-1: Measured and Allowable Emissions
January 5, 2010

Source	Measured and Allowable Emissions				% of Allowable
	Run	Average Measured	Allowable	Units	
Tire Buffer Blower Rubber Collection System	1	0.918	100.00	tpy	**0.9%**
	2	0.764			**0.8%**
	3	0.468			**0.5%**
	Average	**0.717**	**100.00**	**tpy**	**0.7%**

Advanced Industrial Resources, Inc.

Test Results

Wingfoot Commercial Tire System, LLC
Bremen, Georgia
Tire Buffer Blower Rubber Collection System

		Units	Run 1	Run 2	Run 3	Averages
Test Date			05-Jan-10	05-Jan-10	05-Jan-10	
Start Time Method			9:00	11:35	13:48	
End Time Method			11:02	13:36	14:48	
P_m	Pressure of meter gases	inches Hg	29.00	28.99	28.99	28.99
P_s	Pressure of stack gases	inches Hg	28.89	28.89	28.89	28.89
$V_{m(std)}$	Volume of gas sample	dscf	77.56	74.67	37.67	63.30
$V_{w(std),meas}$	Meas. volume of water vapor	scf	0.54	0.61	0.29	0.48
$B_{ws,meas}$	Measured moisture	dimensionless	0.007	0.008	0.008	0.008
$B_{ws,theo}$	Theoretical max. moisture		0.015	0.017	0.017	0.016
$B_{ws,act}$	Actual moisture		0.007	0.008	0.008	0.008
M_d	Mol. Wt. Of gas at DGM	lb./lb.-mole	28.84	28.84	28.84	28.84
M_s	Mol. Wt. Of gas at stack	lb./lb.-mole	28.76	28.75	28.75	28.75
v_s	Velocity of stack gas	ft./sec	16.71	16.24	16.11	16.35
A_n	Area of nozzle	ft^2	0.000676	0.000676	0.000676	0.000676
A_s	Area of stack	ft^2	1.00	1.00	1.00	1.00
Gas Stream Flow Rates						
Q_a	Vol. Flow rate of actual gas	cfm	1,002	975	966	981
Q_{sd}	Vol. Flow rate of dry gas	dscfm	985	951	944	960
I	Isokinetic sampling ratio	percent	97.1	96.8	98.5	97.5
Input Process Throughput						
P	Input Process throughput[1]	tons per hour	2.5	2.5	2.5	2.5
Gas Stream Particulate Concentrations Single Vent						
c_{PM}	Conc. Of PM in dry stack gas	mg/dscm	9.49	8.18	5.05	7.57
c_{PM}	Conc. Of PM in dry stack gas	gr/dscf	0.00415	0.00357	0.00220	0.00331
Particulate Matter Mass Rates Single Vent						
E_{PM}	Emission rate of PM	lb/hour	0.0350	0.0292	0.0178	0.0273
E_{PM}	Emission rate of PM	tpy[2]	0.153	0.127	0.0779	**0.119**
E_{PM} All	Allowable PM Emission Rate	tpy	100	100	100	**100**
% of All	% of Allowable	%	0.15%	0.13%	0.08%	**0.12%**

Advanced Industrial Resources, Inc.
Data Reduction Sheet

Client:	Wingfoot Commercial Tire System, LLC	**Console ID:**	C-007
Location:	Bremen, Georgia	**Y_m:**	0.953
Source:	re Buffer Blower Rubber Collection Syste	**$\Delta H_@$:**	1.828
Test Team:	WLN, GE	**C_p:**	0.84
EPA Methods:	1, 2, 3, 4, 5	**Analyte(s):**	PM

		Units	Run 1	Run 2	Run 3
Test Date			05-Jan-10	05-Jan-10	05-Jan-10
Start Time Method			9:00	11:35	13:48
End Time Method			11:02	13:36	14:48
V_m	**Volume of gas sample**	dcf	81.827	79.753	40.023
M_{lc}	**Mass of liquid collected**	g	11.4	12.9	6.1
Δp	**Velocity head of stack gas**	inches H_2O	0.088	0.083	0.081
$(\Delta p)^{1/2}$	**Square root of velocity head**	(inches H_2O)$^{1/2}$	0.295	0.286	0.284
ΔH	**Pressure differential**	inches H_2O	1.45	1.36	1.34
θ	**Total sampling time**	minutes	120.0	120.0	60.0
D_n	**Diameter of nozzle**	inches	0.352	0.352	0.352
D_s	**Diameter of stack**	inches	12.0 x 12.0	12.0 x 12.0	12.0 x 12.0
T_m	**Temperature of meter**	°R	514	521	518
T_s	**Temperature of stack gas**	°R	515	518	518
P_{bar}	**Barometric pressure**	inches Hg	28.89	28.89	28.89
p_g	**Gauge pressure of stack gas**	inches H_2O	0.00	0.00	0.00
% O_2	**Percent O2 by volume**	percent ($^v/_v$)	20.90	20.90	20.90
% CO_2	**Percent CO2 by volume**	percent ($^v/_v$)	0.00	0.00	0.00
% N_2	**Percent N2 by volume**	percent ($^v/_v$)	79.1	79.1	79.1
m_{PM}	**Mass of PM Method 5**	mg	20.8	17.3	5.4
P	**Input Process throughput[1]**	tons per hour	2.5	2.5	2.5

Notes:
1) Maximum throughput of tires being processed in tire buffer system which is 20 tires per system (x 2 systems) at 125 pounds per tire.

From: Dedek, Tessa M
To: Michael Muzychenko
Subject: IDEM NOD No. 1 for Permit Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Date: Thursday, December 7, 2023 2:39:00 PM
Attachments: image001.png
image002.png
image003.png
image004.png
image005.png
image006.png
image007.png

Dear Michael:

IDEM, OAQ has reviewed the permit application (No. 051-47201-00047) for The Goodyear Tire & Rubber Company and determined that additional information is needed for IDEM to complete its review of the permit application. Therefore, this e-mail serves as a notice of deficiency (NOD) for this permit application. In order for IDEM OAQ to complete its work on this permitting action, the following information is necessary:

1. Please mail in the hard copy of the application, including the signed Cover Sheet form and the GSD 01 form.
2. IDEM needs to determine whether the new direct blower system for the two tire grinding and repair stations (BUF). If you believe the control system is integral to the process, you will need to provide sufficient justification. Please provide the integral evaluation for the new direct blower system for the two tire grinding and repair stations identified as BUF, including the following information:
   a. Have both Cyclone 1 and Cyclone 2 been removed?
   b. Does the new direct blower system control both tire grinding and repair stations?
   c. Please send a description of the tire grinding and repair station process and an explanation of how the direct blower system controls emissions and/or recovers product.
   d. Is the primary purpose of the direct blower system to control air pollution?
   e. Where the direct blower system is recovering product, how do the cost savings from the product recovery compare to the cost of the equipment?
   f. Would the direct blower system be installed if no air quality regulations are in place?
3. In your email from 11/21/2023, you mentioned that one of the tire curing chambers (CUR) and the natural gas-fired water heater (HEAT) have been replaced. Have both of these units been physically removed from the source property?
4. Please send a process flow diagram for the source.

Your written or emailed response (e-mail is preferred) to this NOD must be received by IDEM within sixty (60) days of the date the NOD is sent. The deadline for providing this information is <u>February 5, 2023</u>.

Pursuant to IC 13 15 4 10, the accountability time period has been suspended until the additional information has been received and determined to be adequate. IDEM's Nonrule Policy Document for Air Permit Applications: Notices of Deficiency and Placing Applications on Hold (Air 033 NPD) is available at: https://www.in.gov/idem/files/nrpd_air-033.pdf.

Please specify permit application No. 051-47201-00047 in all correspondence.

Please send a reply e-mail to me confirming that you have received this request for additional information. If you have questions, concerns, or comments regarding this request for additional information, please contact me at your earliest convenience. Thank you in advance for your assistance in providing the information needed to complete your permitting action.

Sincerely,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment
| | | | | www.idem.IN.gov

Help us improve!
IDEM values your feedback

From: Michael Muzychenko
To: Dedek, Tessa M
Subject: RE: [EXT] IDEM NOD No. 1 for Permit Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Date: Monday, January 15, 2024 5:40:11 PM
Attachments: image001.png
image002.png
image003.png
image004.png
image005.png
image006.png
image007.png
Pages 1 2 27 Buffer Manual.pdf
Buffing Process and Calculations.pdf
Process Flow From Source.pdf

Good afternoon,

See below as requested.

1. Please mail in the hard copy of the application, including the signed Cover Sheet form and the GSD 01 form.
    a. To be placed in the mail on 1/16/2024.
2. IDEM needs to determine whether the new direct blower system for the two tire grinding and repair stations (BUF). If you believe the control system is integral to the process, you will need to provide sufficient justification. Please provide the integral evaluation for the new direct blower system for the two tire grinding and repair stations identified as BUF, including the following information: Clarification on my side, the buffer can run without the blower system, however, the rubber dust would clog the buffer which would damage the machine and be a potential fire hazard. Attached are excerpts from the buffer manual related to the suction process.
    a. Have both Cyclone 1 and Cyclone 2 been removed?
        a. Yes, both cyclones have been removed.
    b. Does the new direct blower system control both tire grinding and repair stations?
        a. The blower system is only connected to the tire grinding process. The dust is created at the repair station using pneumatic hand tools and falls to the ground where it is swept up and placed in the rubber dust trailer.
    c. Please send a description of the tire grinding and repair station process and an explanation of how the direct blower system controls emissions and/or recovers product.
        a. See attached buffer Process and Calculations Sheet.
    d. Is the primary purpose of the direct blower system to control air pollution?
        a. The primary purpose is to move rubber dust away from the buffer and blades to protect the machine and to collect the dust for transport to a recycling company.
    e. Where the direct blower system is recovering product, how do the cost savings from the product recovery compare to the cost of the equipment?
        a. I do not understand this question.
    f. Would the direct blower system be installed if no air quality regulations are in place?

    a. Yes, it would still be installed.
3. In your email from 11/21/2023, you mentioned that one of the tire curing chambers (CUR) and the natural gas-fired water heater (HEAT) have been replaced. Have both of these units been physically removed from the source property?
    a. Yes, both have been physically removed.
4. Please send a process flow diagram for the source.
    a. See attached.

Your written or emailed response (e-mail is preferred) to this NOD must be received by IDEM within sixty (60) days of the date the NOD is sent. The deadline for providing this information is February 5, 2023.

Pursuant to IC 13 15 4 10, the accountability time period has been suspended until the additional information has been received and determined to be adequate. IDEM's Nonrule Policy Document for Air Permit Applications: Notices of Deficiency and Placing Applications on Hold (Air 033 NPD) is available at: https://www.in.gov/idem/files/nrpd_air-033.pdf.

Please specify permit application No. 051-47201-00047 in all correspondence.

Please send a reply e-mail to me confirming that you have received this request for additional information. If you have questions, concerns, or comments regarding this request for additional information, please contact me at your earliest convenience. Thank you in advance for your assistance in providing the information needed to complete your permitting action.

Sincerely,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment
| | | | | www.idem.IN.gov

Help us improve!
IDEM values your feedback

since 1956
matteuzzi

MACCHINE PER PNEUMATICI E PER I PROCESSI DI RICOSTRUZIONE
EQUIPMENT FOR THE TYRE AND RETREADING INDUSTRIES

matteuzzi srl
Via Serra 1/E - 3
40012 Calderara di Reno - Bologna - ITALY
Tel. +39 - 051726351
Fax +39 - 051726283
matteuzzi@matteuzzi-srl.com

www.matteuzzi-srl.com

OPERATION AND MAINTENANCE MANUAL

RAS 98-E ULTRA

COMPUTER CONTROLLED BUFFING MACHINE

First printed on 21 April 2020 Revision: 2 / *17.05.2023*	

machine type	**RAS 98E ULTRA,** *computer-controlled buffing machine*
year of manufacture	2023
serial no.	MAT-22159
manufacturer	MATTEUZZI SRL Via Serra, 1/E – 3 40012 CALDERARA DI RENO BOLOGNA - Italy
importer	

Questo manuale è parte integrante della macchina e deve essere disponibile durante l'uso della macchina stessa e per la cessione ad eventuali altri utilizzatori.

This manual is an integral part of the machine. It must be kept close to hand when using the machine and must be available for transfer to other users if necessary.

Cette brochure fait partie intégrante de la machine; elle doit être disponible pendant le fonctionnement de la machine et accompagner la machine en cas de cession à d'autres utilisateurs.

Diese Betriebsanleitung ist ein ergänzender Bestandteil der Maschine. Alle Bediener müssen während des Betriebs direkten Zugang zur Anleitung haben .

2.4.4. SUCTION AND COLLECTION OF PROCESS DUST

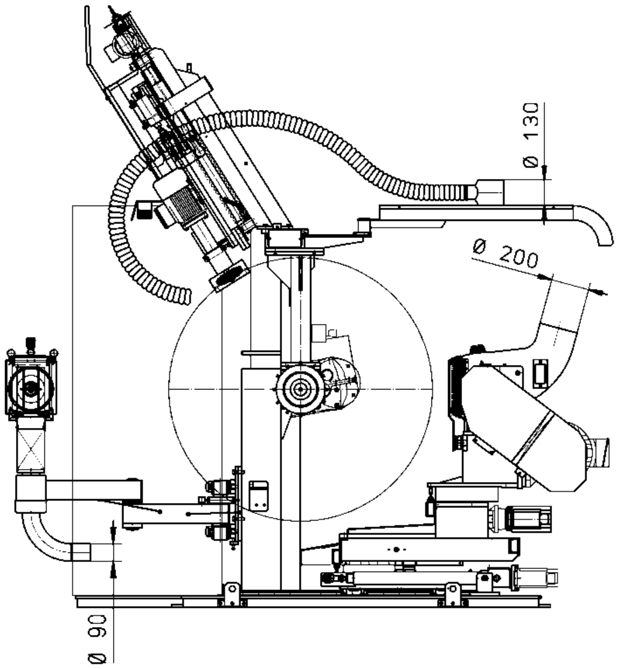


Figure 7: machine outlets for suction system connection

During buffing, the machine produces dust and heavy rubber waste which, in the absence of a suitable suction system, would be deposited on the floor and on the parts close to the buffing tool, thereby damaging the moving parts. Buffing may also cause workplace emissions of inhalable rubber dust.

THE OUTLETS FACTORY FITTED TO THE MACHINE - SEE Figure 7 - MUST BE CONNECTED TO A SYSTEM WHICH GUARANTEES THE FOLLOWING SUCTION CHARACTERISTICS AT THE OUTLET OF THE MAIN RASP:

MINIMUM SPEED: 30 m/sec

MINIMUM CAPACITY: 3400 m^3/hour

THE DIMENSIONS OF THE CONNECTOR HOSES MUST BE AS SHOWN IN THE FIGURE AND THE HOSES MUST BE MAINTAINED IN PERFECT WORKING CONDITION.

The process dust collector bin must have sufficient capacity in relation to the number of casings being buffed and must therefore be emptied regularly.

The composition of the process dust and scrap may differ according to the components used by the tyre manufacturer. All waste must be disposed of following the procedures laid down by local regulations.

1. Tire Buffing

This facility will have two tire buffers, RAS 98E – Ultra, connected to a blower and a recycle collection trailer. A water mister is mounted on the tire buffer to control opacity and the temperature of the knives during the rasping process. Particulate removal is accomplished by the blower creating a vacuum/suction at the point of tire and rasp contact. The material is pulled into the blower and collected in the rubber recycle trailer for transport, removal and recycle off site. The rubber particle control/collection system is considered as an integral part of the tire buffing process. This blower collection system facilitates the movement of the buffed rubber material away from the buffing machine; without this equipment the buffer would quickly plug due to the accumulation of buffed material. The buffing machines cannot operate in production mode with out the blower being operational.

Air sampling tests have been conducted at a company facility that shows the particulate capture efficiency to be 99.95%

Company records show that an average of 14.05 lbs. rubber/tire is removed. Therefore, all calculations are based on 14.05 lbs. rubber/tire as the removal rate.

There are VOC's and PM emissions from the tire buffing process. Some of the VOC's are listed HAP's. The HAP's consist of twenty-six listed HAP's of various quantities. The RMA emission factors for the tire buffing process are:

VOC's = 5.21 x 10E-4 lb. /lb. rubber removed
HAP's = 1.27 x 10E-4 lb. /lb. rubber removed
PM = 5.45 x 10E-1 lb. /lb. rubber removed

The tire buffing emissions are based on 24 hours per day, 7 days per week, 52 weeks per year; this is equal to 8,736 hours per year total:

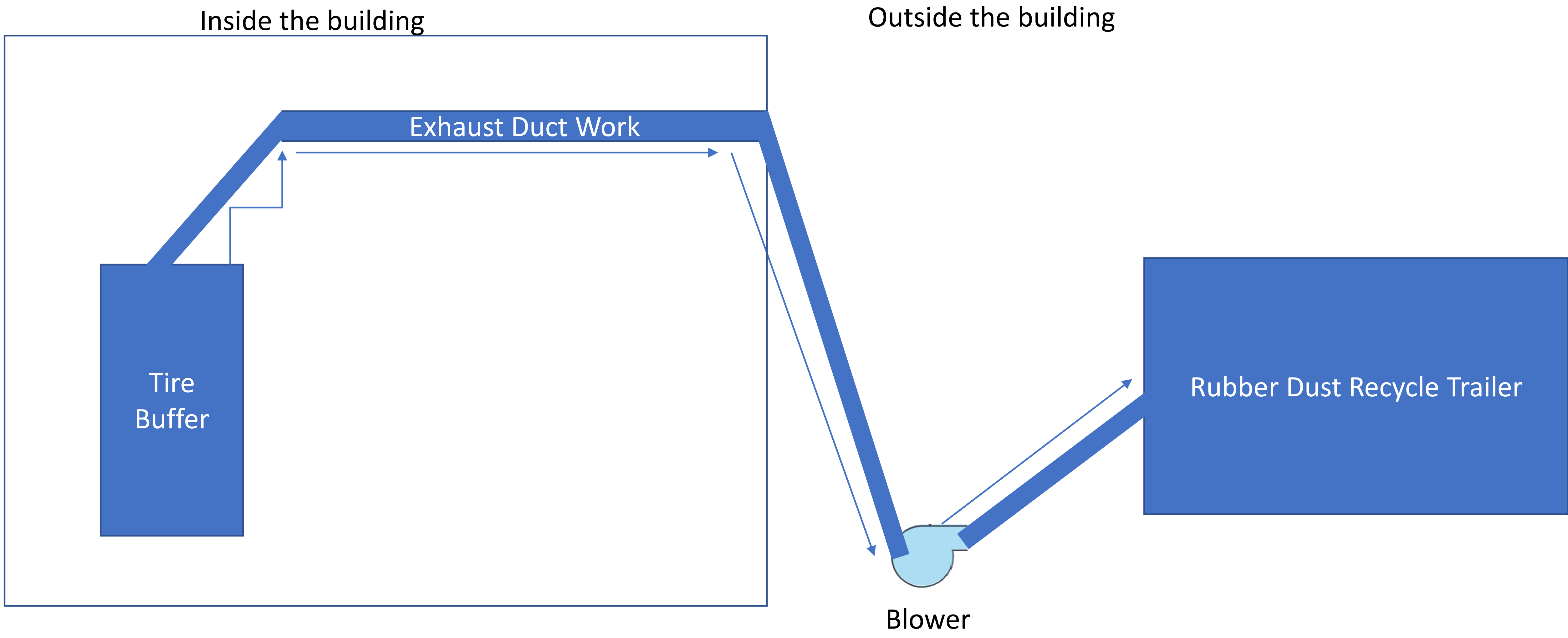
VOC = (20 tires buffed/hr.) (14.05 lbs. rubber removed/tire)(5.21 x 10E-4) (8,736 hr /yr)/ (1 ton/2000) = 0.64 tons/yr VOC's for 1 buffer, x 2 buffers = 1.28 tons/yr VOC's

HAP's = (20 tires buffed/hr) (14.05 lbs rubber removed/tire) (1.27 x10E-4) (8,736 hr/yr)/ (1 ton/2000) = 0.16 tons/yr HAP's for 1 buffer, x 2 buffers = 0.32 tons/yr HAP's

PM = (20 tires buffed/hr) (14.05 lbs. rubber removed/tire) (5.45 x 10E-1) (1-0.9995) (8,736 hr yr)/ (1 ton/2000) = 0.33 tons/yr PM

PM 10 = (0.077 lb/hr) (8,736) (90.9%) (1 ton/2,000) = 0.31 tons PM 10

$$PM\ 2.5 = (0.077\ lb/hr)\ (8{,}736)\ (78.1\%)\ (1\ ton/2{,}000) = 0.27\ tons\ PM\ 2.5$$


Inside the building
Outside the building
Exhaust Duct Work
Tire
Buffer
Rubber Dust Recycle Trailer
Blower


"We Buy Rubber Buffings"
RDF
75

From:	Dedek, Tessa M
To:	"Michael Muzychenko"
Subject:	RE: [EXT] IDEM NOD No. 1 for Permit Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Date:	Tuesday, January 30, 2024 10:35:00 AM
Attachments:	image001.png image002.png image003.png image004.png image005.png image006.png image007.png

---

Hi Michael,

Thanks for this, I appreciate it! Question (2)(e) refers to a cost savings analysis. Typically this, and the other integral evaluation info, needs to be included in the application. The cost savings analysis usually includes info like the initial cost of the equipment, cost of maintenance, the expected lifetime of the equipment, the amount of product saved, the cost of the product, etc. If you're not familiar with the integral evaluation process, I recommend contacting an environmental consultant or the IDEM Compliance and Technical Assistance Program (CTAP). You can try CTAP, but the cost savings analysis is somewhat complicated and involves calculations, so I imagine it'd be tough over the phone.

Thanks,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment

From: Michael Muzychenko <michael_muzychenko@goodyear.com>
Sent: Monday, January 15, 2024 5:38 PM
To: Dedek, Tessa M <TDedek@idem.IN.gov>
Subject: RE: [EXT] IDEM NOD No. 1 for Permit Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

---

Good afternoon,

See below as requested.

1. Please mail in the hard copy of the application, including the signed Cover Sheet form and the GSD 01 form.
    a. To be placed in the mail on 1/16/2024.
2. IDEM needs to determine whether the new direct blower system for the two tire grinding and repair stations (BUF). If you believe the control system is integral to the process, you will need to provide sufficient justification. Please provide the integral evaluation for the new direct blower system for the two tire grinding and repair stations identified as BUF, including the following information: Clarification on my side, the buffer can run without the blower system,

however, the rubber dust would clog the buffer which would damage the machine and be a potential fire hazard. Attached are excerpts from the buffer manual related to the suction process.

a. Have both Cyclone 1 and Cyclone 2 been removed?
    a. Yes, both cyclones have been removed.
b. Does the new direct blower system control both tire grinding and repair stations?
    a. The blower system is only connected to the tire grinding process. The dust is created at the repair station using pneumatic hand tools and falls to the ground where it is swept up and placed in the rubber dust trailer.
c. Please send a description of the tire grinding and repair station process and an explanation of how the direct blower system controls emissions and/or recovers product.
    a. See attached buffer Process and Calculations Sheet.
d. Is the primary purpose of the direct blower system to control air pollution?
    a. The primary purpose is to move rubber dust away from the buffer and blades to protect the machine and to collect the dust for transport to a recycling company.
e. Where the direct blower system is recovering product, how do the cost savings from the product recovery compare to the cost of the equipment?
    a. I do not understand this question.
f. Would the direct blower system be installed if no air quality regulations are in place?
    a. Yes, it would still be installed.

3. In your email from 11/21/2023, you mentioned that one of the tire curing chambers (CUR) and the natural gas-fired water heater (HEAT) have been replaced. Have both of these units been physically removed from the source property?
    a. Yes, both have been physically removed.
4. Please send a process flow diagram for the source.
    a. See attached.

Your written or emailed response (e-mail is preferred) to this NOD must be received by IDEM within sixty (60) days of the date the NOD is sent. The deadline for providing this information is February 5, 2023.

Pursuant to IC 13 15 4 10, the accountability time period has been suspended until the additional information has been received and determined to be adequate. IDEM's Nonrule Policy Document for Air Permit Applications: Notices of Deficiency and Placing Applications on Hold (Air 033 NPD) is available at: https://www.in.gov/idem/files/nrpd_air-033.pdf.

Please specify permit application No. 051-47201-00047 in all correspondence.

Please send a reply e-mail to me confirming that you have received this request for additional information. If you have questions, concerns, or comments regarding this request for additional information, please contact me at your earliest convenience. Thank you in advance for your assistance in providing the information needed to complete your permitting action.

Sincerely,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment

| www.idem.IN.gov

Help us improve!
IDEM values your feedback

From: Dedek, Tessa M
To: Michael Muzychenko
Subject: RE: [EXT] IDEM NOD No. 1 for Permit Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Date: Thursday, February 8, 2024 3:38:00 PM
Attachments: image001.png
image002.png
image003.png
image004.png
image005.png
image006.png
image007.png

Hi Mike – yes, those are the two forms that need to be mailed in. Please make sure the Cover Sheet form is signed by the responsible official for the source.

Thanks,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment

From: Michael Muzychenko <michael_muzychenko@goodyear.com>
Sent: Wednesday, February 7, 2024 8:53 AM
To: Dedek, Tessa M <TDedek@idem.IN.gov>
Subject: RE: [EXT] IDEM NOD No. 1 for Permit Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

**** This is an EXTERNAL email. Exercise caution. DO NOT open attachments or click links from unknown senders or unexpected email. ****

Good morning,

I think I errored on what I needed to mail in. What forms needed mailed in again?

- Just forms 50640 and 50639?

Thank you,

Mike

#Safest Operations

Mike Muzychenko, CSP
Environment, Health, & Safety Manager
Commercial Tire & Service Centers

From: Dedek, Tessa M <TDedek@idem.IN.gov>
Sent: Tuesday, January 30, 2024 10:35 AM
To: Michael Muzychenko <michael_muzychenko@goodyear.com>
Subject: RE: [EXT] IDEM NOD No. 1 for Permit Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

Hi Michael,

Thanks for this, I appreciate it! Question (2)(e) refers to a cost savings analysis. Typically this, and the other integral evaluation info, needs to be included in the application. The cost savings analysis usually includes info like the initial cost of the equipment, cost of maintenance, the expected lifetime of the equipment, the amount of product saved, the cost of the product, etc. If you're not familiar with the integral evaluation process, I recommend contacting an environmental consultant or the IDEM Compliance and Technical Assistance Program (CTAP). You can try CTAP, but the cost savings analysis is somewhat complicated and involves calculations, so I imagine it'd be tough over the phone.

Thanks,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment

From: Michael Muzychenko <michael_muzychenko@goodyear.com>
Sent: Monday, January 15, 2024 5:38 PM
To: Dedek, Tessa M <TDedek@idem.IN.gov>
Subject: RE: [EXT] IDEM NOD No. 1 for Permit Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

---

Good afternoon,

See below as requested.

1. Please mail in the hard copy of the application, including the signed Cover Sheet form and the GSD 01 form.
    a. To be placed in the mail on 1/16/2024.
2. IDEM needs to determine whether the new direct blower system for the two tire grinding and repair stations (BUF). If you believe the control system is integral to the process, you will need to provide sufficient justification. Please provide the integral evaluation for the new direct blower system for the two tire grinding and repair stations identified as BUF, including the following information: Clarification on my side, the buffer can run without the blower system, however, the rubber dust would clog the buffer which would damage the machine and be a potential fire hazard. Attached are excerpts from the buffer manual related to the suction process.
    a. Have both Cyclone 1 and Cyclone 2 been removed?
        a. Yes, both cyclones have been removed.
    b. Does the new direct blower system control both tire grinding and repair stations?
        a. The blower system is only connected to the tire grinding process. The dust is created at the repair station using pneumatic hand tools and falls to the ground where it is swept up and placed in the rubber dust trailer.
    c. Please send a description of the tire grinding and repair station process and an explanation of how the direct blower system controls emissions and/or recovers product.
        a. See attached buffer Process and Calculations Sheet.
    d. Is the primary purpose of the direct blower system to control air pollution?
        a. The primary purpose is to move rubber dust away from the buffer and blades to protect the machine and to collect the dust for transport to a recycling company.
    e. Where the direct blower system is recovering product, how do the cost savings from the product recovery compare to the cost of the equipment?
        a. I do not understand this question.
    f. Would the direct blower system be installed if no air quality regulations are in place?
        a. Yes, it would still be installed.
3. In your email from 11/21/2023, you mentioned that one of the tire curing chambers (CUR) and the natural gas-fired water heater (HEAT) have been replaced. Have both of these units been physically removed from the source property?
    a. Yes, both have been physically removed.
4. Please send a process flow diagram for the source.
    a. See attached.

Your written or emailed response (e-mail is preferred) to this NOD must be received by IDEM within sixty (60) days of the date the NOD is sent. The deadline for providing this information is <u>February 5, 2023</u>.

Pursuant to IC 13 15 4 10, the accountability time period has been suspended until the additional information has been received and determined to be adequate. IDEM's Nonrule Policy Document for Air Permit Applications: Notices of Deficiency and Placing Applications on Hold (Air 033 NPD) is available at: https://www.in.gov/idem/files/nrpd_air-033.pdf.

Please specify permit application No. 051-47201-00047 in all correspondence.

Please send a reply e-mail to me confirming that you have received this request for additional information. If you have questions, concerns, or comments regarding this request for additional information, please contact me at your earliest convenience. Thank you in advance for your assistance in providing the information needed to complete your permitting action.

Sincerely,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment
| | | | | www.idem.IN.gov

From:	Dedek, Tessa M
To:	Michael Muzychenko
Subject:	RE: [EXT] IDEM NOD No. 1 for Permit Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Date:	Tuesday, April 2, 2024 9:20:00 AM
Attachments:	image001.png image002.png image003.png image004.png image005.png image006.png image007.png

I just wanted to add that we're planning to proceed assuming the new direct blower system is not integral. That means Goodyear Tire will have to transition to a higher permit level and may receive enforcement action since the new control device has already been installed.

Please let me know if you have any questions,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment

From: Dedek, Tessa M
Sent: Tuesday, April 2, 2024 8:45 AM
To: Michael Muzychenko <michael_muzychenko@goodyear.com>
Subject: RE: [EXT] IDEM NOD No. 1 for Permit Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

Hi Mike,

I wanted to check in and see if you're getting close to being able to provide the rest of the integral evaluation. Please let me know.

Thanks,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment

From: Dedek, Tessa M
Sent: Thursday, February 8, 2024 3:39 PM
To: Michael Muzychenko <michael_muzychenko@goodyear.com>
Subject: RE: [EXT] IDEM NOD No. 1 for Permit Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

Hi Mike – yes, those are the two forms that need to be mailed in. Please make sure the Cover Sheet form is signed by the responsible official for the source.

Thanks,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment

From: Michael Muzychenko <michael_muzychenko@goodyear.com>
Sent: Wednesday, February 7, 2024 8:53 AM
To: Dedek, Tessa M <TDedek@idem.IN.gov>
Subject: RE: [EXT] IDEM NOD No. 1 for Permit Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

Good morning,

I think I errored on what I needed to mail in. What forms needed mailed in again?

- Just forms 50640 and 50639?

Thank you,

Mike

#Safest Operations

Mike Muzychenko, CSP
Environment, Health, & Safety Manager

Commercial Tire & Service Centers

From: Dedek, Tessa M <TDedek@idem.IN.gov>
Sent: Tuesday, January 30, 2024 10:35 AM
To: Michael Muzychenko <michael_muzychenko@goodyear.com>
Subject: RE: [EXT] IDEM NOD No. 1 for Permit Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

Hi Michael,

Thanks for this, I appreciate it! Question (2)(e) refers to a cost savings analysis. Typically this, and the other integral evaluation info, needs to be included in the application. The cost savings analysis usually includes info like the initial cost of the equipment, cost of maintenance, the expected lifetime of the equipment, the amount of product saved, the cost of the product, etc. If you're not familiar with the integral evaluation process, I recommend contacting an environmental consultant or the IDEM Compliance and Technical Assistance Program (CTAP). You can try CTAP, but the cost savings analysis is somewhat complicated and involves calculations, so I imagine it'd be tough over the phone.

Thanks,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment

From: Michael Muzychenko <michael_muzychenko@goodyear.com>
Sent: Monday, January 15, 2024 5:38 PM
To: Dedek, Tessa M <TDedek@idem.IN.gov>
Subject: RE: [EXT] IDEM NOD No. 1 for Permit Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

---

Good afternoon,

See below as requested.

1. Please mail in the hard copy of the application, including the signed Cover Sheet form and the GSD 01 form.

   a. To be placed in the mail on 1/16/2024.

2. IDEM needs to determine whether the new direct blower system for the two tire grinding and repair stations (BUF). If you believe the control system is integral to the process, you will need to provide sufficient justification. Please provide the integral evaluation for the new direct blower system for the two tire grinding and repair stations identified as BUF, including the following information: Clarification on my side, the buffer can run without the blower system, however, the rubber dust would clog the buffer which would damage the machine and be a potential fire hazard. Attached are excerpts from the buffer manual related to the suction process.
   a. Have both Cyclone 1 and Cyclone 2 been removed?
      a. Yes, both cyclones have been removed.
   b. Does the new direct blower system control both tire grinding and repair stations?
      a. The blower system is only connected to the tire grinding process. The dust is created at the repair station using pneumatic hand tools and falls to the ground where it is swept up and placed in the rubber dust trailer.
   c. Please send a description of the tire grinding and repair station process and an explanation of how the direct blower system controls emissions and/or recovers product.
      a. See attached buffer Process and Calculations Sheet.
   d. Is the primary purpose of the direct blower system to control air pollution?
      a. The primary purpose is to move rubber dust away from the buffer and blades to protect the machine and to collect the dust for transport to a recycling company.
   e. Where the direct blower system is recovering product, how do the cost savings from the product recovery compare to the cost of the equipment?
      a. I do not understand this question.
   f. Would the direct blower system be installed if no air quality regulations are in place?
      a. Yes, it would still be installed.
3. In your email from 11/21/2023, you mentioned that one of the tire curing chambers (CUR) and the natural gas-fired water heater (HEAT) have been replaced. Have both of these units been physically removed from the source property?
   a. Yes, both have been physically removed.
4. Please send a process flow diagram for the source.
   a. See attached.

Your written or emailed response (e-mail is preferred) to this NOD must be received by IDEM within sixty (60) days of the date the NOD is sent. The deadline for providing this information is February 5, 2023.

Pursuant to IC 13 15 4 10, the accountability time period has been suspended until the additional information has been received and determined to be adequate. IDEM's Nonrule Policy Document for Air Permit Applications: Notices of Deficiency and Placing Applications on Hold (Air 033 NPD) is available at: https://www.in.gov/idem/files/nrpd_air-033.pdf.

Please specify permit application No. 051-47201-00047 in all correspondence.

Please send a reply e-mail to me confirming that you have received this request for additional information. If you have questions, concerns, or comments regarding this request for additional information, please contact me at your earliest convenience. Thank you in advance for your assistance in providing the information needed to complete your permitting action.

Sincerely,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment
| | | | | www.idem.IN.gov

Help us improve!
IDEM values your feedback

From:	Dedek, Tessa M
To:	Michael Muzychenko
Subject:	Info Request for Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Date:	Wednesday, April 3, 2024 10:55:00 AM
Attachments:	EPA Memo for Integral Controls.pdf EPA Air Pollution Control Cost Manual Section 6.pdf image001.png image002.png image003.png image004.png image005.png image006.png image007.png 43933f Ingredion Indy TV SSM Minor PSD.pdf

Hi Mike,

Here's some guidance on integral evaluations. The EPA Memo has the criteria we look for. The cost manual has some info and examples of what we look for in the cost analysis. The attached permit has 2 completed integral analyses in the TSD if you want to look at that.

Thanks,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment
| | | | | www.idem.IN.gov

Help us improve!
IDEM values your feedback

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK. NC 27711

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

NOV 27 1995

Mr. Timothy J. Mohin
Government Affairs Manager
Environment, Health and Safety
Intel Government Affairs
888 17th Street Northwest, #860
Washington, DC 20006-3939

Dear Mr. Mohin:

Thank you for the additional information you provided regarding the exhaust conditioners used in tool operations in the semiconductor industry. We agree with your assessment that, for potential to emit calculations, the exhaust conditioners should be considered as an inherent part of the process.

<u>Criteria for Determining Whether Equipment is Air Pollution Control Equipment or Process Equipment</u>

For purposes of determining a source's potential to emit, it is necessary to calculate the effect of air pollution control equipment. Current Environmental Protection Agency (EPA) regulations and policy allow air pollution control equipment to be taken into account if federally enforceable requirements are in place requiring the use of such air pollution control equipment. There are, however, situations for which case-by-case judgements are needed regarding whether a given device or strategy should be considered as air pollution control equipment, or as an inherent part of the process. The EPA believes that the following list of questions should be considered in making such case-by-case judgements as to whether certain devices or practices should be treated as pollution controls or an inherent to the process:.

1. Is the primary purpose of the equipment to control air pollution?

2. Where the equipment is recovering product, how do the cost savings from the product recovery compare to the cost of the equipment?

3. Would the equipment be installed if no air quality regulations are in place?

If the answers to these questions suggest that equipment should be considered as an inherent part of the process, then the effect of the equipment or practices can be taken into account in calculating potential emissions regardless of whether enforceable limitations are in effect.

Analysis of the criteria for the semiconductor tools listed

No information supplied to date by Intel suggests that product recovery by the exhaust conditioners is significant. That EPA believes that the first and third criteria are satisfied.

Criteria 1. The exhaust conditioners described in your letter are small treatment systems that are local to the point-of-use of process tools such as etching and deposition processes. The primary purposes are to: (1) increase the uptime of the process tools, (2) to minimize safety hazards, and (3) to prevent impurities from entering other processes.

Criteria 3. The information you have provided suggests strongly that air quality regulations are not the driving factor for installation of the equipment. Moreover, the fact that they are "interlocked" with the process chambers suggests that the process cannot operate unless the exhaust conditioner is in use.

Therefore, based upon a review of the information presented the exhaust conditioners are considered by the EPA to be inherent to the process and can be considered in potential emission calculations without federally enforceable requirements.

Cautions

The above determination regarding the use of the localized exhaust conditioners in the semiconductor industry is case-specific. This determination is not intended to set a precedent for localized pollution control equipment for other source types without a similar case-specific review.

While many types of point-of-use and interlocked treatment device may be considered as "inherent," there does exist, of course, air pollution control equipment at semiconductor facilities that may not meet the above criteria. For example, a remote water scrubber located at the roof of a building would generally be considered an air pollution control device.

If you have any further questions regarding this matter, please call Timothy Smith at (919) 541-4718, or Tony Wayne at (919) 541-5439.

sincerely,

David Solomon
Acting Group Leader
Integrated Implementation Group

cc: Chief, Air Branch, Regions I-X
Regional PTE Contacts

EPA/452/B-02-001

Section 6

Particulate Matter Controls

EPA/452/B-02-001

Chapter 1

Baghouses and Filters

James H. Turner
Research Triangle Institute
Research Triangle Park, NC 22709

John D. McKenna
John C. Mycock
Arthur B. Nunn
ETS, Inc.
Roanoke, VA 24018-4394

William M. Vatavuk
Innovative Strategies and Economics Group, OAQPS
U.S. Environmental Protection Agency
Research Triangle Park, NC 22711

December 1998

Contents

1.1 Introduction

A fabric filter unit consists of one or more isolated compartments containing rows of fabric bags in the form of round, flat, or shaped tubes, or pleated cartridges. Particle-laden gas passes up (usually) along the surface of the bags then radially through the fabric. Particles are retained on the upstream face of the bags, and the cleaned gas stream is vented to the atmosphere. The filter is operated cyclically, alternating between relatively long periods of filtering and short periods of cleaning. During cleaning, dust that has accumulated on the bags is removed from the fabric surface and deposited in a hopper for subsequent disposal.

Fabric filters collect particles with sizes ranging from submicron to several hundred microns in diameter at efficiencies generally in excess of 99 or 99.9 percent. The layer of dust, or dust cake, collected on the fabric is primarily responsible for such high efficiency. The cake is a barrier with tortuous pores that trap particles as they travel through the cake. Gas temperatures up to about 500°F, with surges to about 550°F can be accommodated routinely in some configurations. Most of the energy used to operate the system appears as pressure drop across the bags and associated hardware and ducting. Typical values of system pressure drop range from about 5 to 20 inches of water. Fabric filters are used where high-efficiency particle collection is required. Limitations are imposed by gas characteristics (temperature and corrosivity) and particle characteristics (primarily stickiness) that affect the fabric or its operation and that cannot be economically accommodated.

Important process variables include particle characteristics, gas characteristics, and fabric properties. The most important design parameter is the air- or gas-to-cloth ratio (the amount of gas in ft^3/min that penetrates one ft^2 of fabric) and the usual operating parameter of interest is pressure drop across the filter system. The major operating feature of fabric filters that distinguishes them from other gas filters is the ability to renew the filtering surface periodically by cleaning. Common furnace filters, high efficiency particulate air (HEPA) filters, high efficency air filters (HEAFs), and automotive induction air filters are examples of filters that must be discarded after a significant layer of dust accumulates on the surface. These filters are typically made of matted fibers, mounted in supporting frames, and used where dust concentrations are relatively low. Fabric filters are usually made of woven or (more commonly) needlepunched felts sewn to the desired shape, mounted in a plenum with special hardware, and used across a wide range of dust concentrations.

Another type of fabric filter developed in the 1970s and 1980s is the electrostatically enhanced filter. Pilot plant baghouses employing this technology have shown substantially lower pressure drops than conventional filter designs. Further, some cost analyses have shown that electrostatically enhanced baghouses could have lower lifetime costs than convention baghouses. The purpose of this chapter, however, is to focus only on currently available commercial filters. Readers interested in electrostatically enhanced filtration may consult such references as Van Osdell et al. [1] , Viner et al. [2] , or Donovan [3].

1.2 Process Description

In this section, the types of fabric filters and the auxiliary equipment required are discussed first from a general viewpoint. Then, fabric filtration theory as applied to each type of filter is discussed to lay a foundation for the sizing procedures. Fabric filters can be categorized by several means, including type of cleaning (shaker, reverse-air, pulse-jet), direction of gas flow (from inside the bag towards the outside or vice versa), location of the system fan (suction or pressure), or size (low, medium, or high gas flow quantity). Of these four approaches, the cleaning method is probably the most distinguishing feature. Fabric filters are discussed in this section based on the type of cleaning employed.

1.2.1 Shaker Cleaning

For any type of cleaning, enough energy must be imparted to the fabric to overcome the adhesion forces holding dust to the bag. In shaker cleaning, used with inside-to-outside gas flow, energy transfer is accomplished by suspending the bag from a motor-driven hook or framework that oscillates. Motion may be imparted to the bag in several ways, but the general effect is to create a sine wave along the fabric. As the fabric moves outward from the bag centerline during portions of the wave action, accumulated dust on the surface moves with the fabric. When the fabric reaches the limit of its extension, the patches of dust have enough inertia to tear away from the fabric and descend to the hopper.

For small, single-compartment baghouses, usually operated intermittently, a lever attached to the shaker mechanism may be operated manually at appropriate intervals, typically at the end of a shift. In multi-compartment baghouses, usually operated continuously, a timer or a pressure sensor responding to system pressure drop initiates bag shaking automatically. The compartments operate in sequence so that one compartment at a time is cleaned. Forward gas flow to the compartment is stopped, dust is allowed to settle, residual gas flow stops, and the shaker mechanism is switched on for several seconds to a minute or more. The settling and shaking periods may be repeated, then the compartment is brought back on-line for filtering. As a result of no forward flow through the compartment, the baghouse collecting area must be increased to compensate for that portion being out of service at any time for cleaning. Figure 1.1 illustrates a shaker-cleaned baghouse.

Parameters that affect cleaning include the amplitude and frequency of the shaking motion and the tension of the mounted bag. The first two parameters are part of the baghouse design and generally are not changed easily. The tension is set when bags are installed. Typical values are about 4 Hz for frequency and 2 to 3 inches for amplitude (half-stroke).[4] Some installations allow easy adjustment of bag tension, while others require that the bag be loosened and reclamped to its attaching thimble.

Compared with reverse-air cleaned bags (discussed below) the vigorous action of shaker systems tends to stress the bags more, which requires heavier and more durable fabrics. In the United States, woven fabrics are used almost exclusively for shaker cleaning.[5] European practice allows the use of felted fabrics at somewhat higher filtering velocities. These higher velocities allow construction of a smaller baghouse, which requires less capital. However, the higher velocities lead to higher pressure drop, which increases operating costs. For any given application, an economic balance exists that must often be found by estimating costs for both types of fabric. Significant research has been done with shaker baghouses and the woven fabrics used in them, and many shaker baghouses remain in service. However, the majority of newly erected baghouses are pulse jets. Where baghouses larger than typical pulse jets are required, they are often custom-built, reverse-air units. The pulse-jet baghouses have become popular because they occupy less space than the equivalent shaker baghouse and are perceived as being less expensive. For high-temperature applications using glass bags, longer bag life may be expected than would be found with shaker baghouses.

1.2.2 Reverse-air Cleaning

When glass fiber fabrics were introduced, a gentler means of cleaning the bags, which may be a foot in diameter and 30 feet in length, was needed to prevent premature degradation. Reverse-air cleaning was developed as a less intensive way to impart energy to the bags. In reverse-air cleaning, gas flow to the bags is stopped in the compartment being cleaned and reverse (outside-in) air flow is directed through the bags. This reversal of gas flow gently collapses the bags toward their centerlines, which causes the cake to detach from the fabric surface. The detachment is caused by shear forces developed between the dust and fabric as the latter changes its shape. Metal caps to support the bag tops are an integral part of the bag as are several sewn-in rings that encircle the bags to prevent their complete collapse during cleaning. Without these rings, falling collected dust tends to choke the bag as the fabric collapses in on itself while cleaning. As with multi-compartment shaker baghouses, a similar cycle takes place in reverse-air baghouses of stopping forward gas flow and allowing dust to settle before cleaning action begins. Also, as with shaker baghouses, extra filtering capacity must be added to reverse-air baghouses to compensate for that portion out of service for cleaning at any time. Some reverse-air baghouses employ a supplemental shaker system to assist cleaning by increasing the amount of energy delivered to the bag.

The source of reverse air is generally a separate system fan capable of supplying clean, dry air for one or two compartments at a gas-to-cloth ratio as high or higher than that of the forward gas flow. Figure 1.2 illustrates a reverse-air cleaned baghouse.

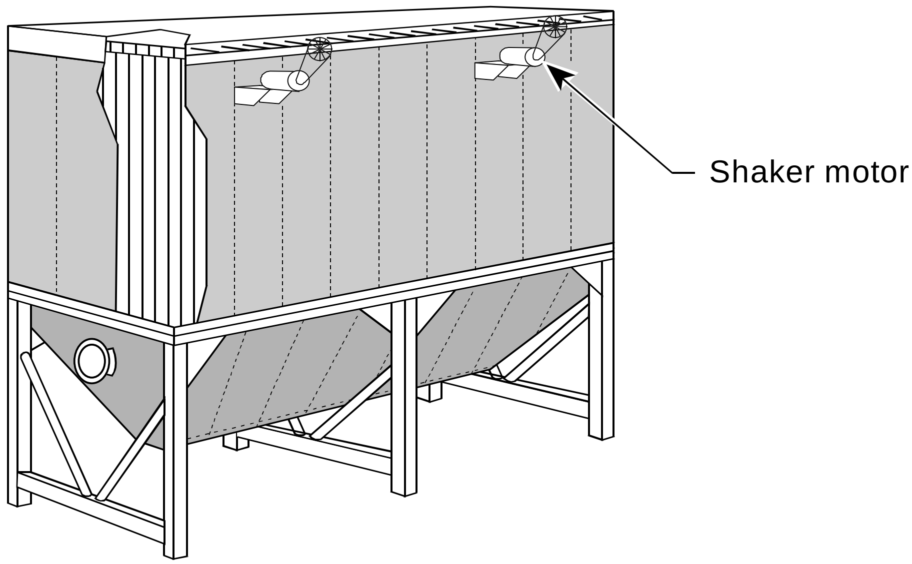


Figure 1.1: Typical Shaker Baghouse
(Courtesy of North Carolina State University)

1.2.3 Pulse-jet Cleaning

An advantage of pulse-jet cleaning compared to shaker or reverse-air baghouses is the reduction in baghouse size (and capital cost) allowed by using less fabric because of higher gas-to-cloth ratios and, in some cases, by not having to build an extra compartment for off-line cleaning. However, the higher gas-to-cloth ratios cause higher pressure drops that increase operating costs. This form of cleaning uses compressed air to force a burst of air down through the bag and expand it violently. As with shaker baghouses, the fabric reaches its extension limit and the dust separates from the bag. Air escaping through the bag carries the separated dust away from the fabric surface. In pulse jets, however, filtering gas flows are opposite in direction when compared with shaker or reverse-air baghouses (i.e., outside-in). Figure 1.3 illustrates a pulse-jet cleaned baghouse.

1.2.3.1 Caged Filters

In conventional pulse-jet baghouses, bags are mounted on wire cages to prevent collapse while the dusty gas flows from outside the bag to the inside during filtration. Instead of attaching both ends of the bag to the baghouse structure, the bag and cage assembly generally is attached only at the top. The bottom end of the assembly tends to move in the turbulent gas flow during filtration and may rub other bags, which accelerates wear.

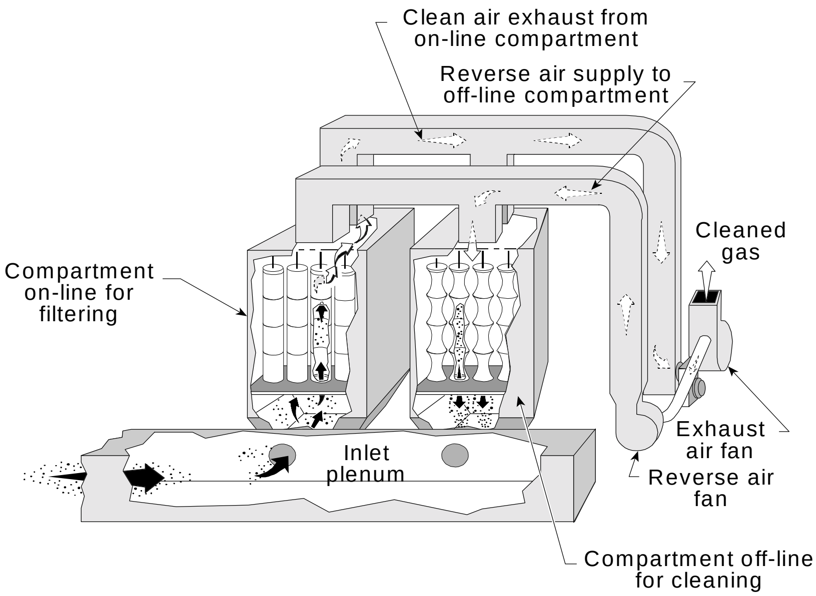


Figure 1.2: Typical Reverse-Air Baghouse
(Courtesy of North Carolina State University)

Often, pulse-jet baghouses are not compartmented. Bags are cleaned one row at a time when a timer initiates the burst of cleaning air through a quick-opening valve. A pipe across each row of bags carries the compressed air. The pipe has a nozzle above each bag so that cleaning air exits directly into the bag. Some systems direct the air through a short venturi that is intended to entrain additional cleaning air. The pulse opposes and interrupts forward gas flow for only a few tenths of a second. However, the quick resumption of forward flow redeposits most of the dust back on the clean bag or on adjacent bags. This action has the disadvantage of inhibiting dust from dropping into the hopper, but the advantage of quickly reforming the dust cake that provides efficient particle collection.

To increase filter area in the same volume of baghouse, star-shaped and pleated (in cross section) bag/cage configurations have been developed. The bag/cage combination is designed as a unit to be installed similarly to a standard bag and cage unit. Such units can be used as replacements for standard bags and cages when additional fabric area is needed, or may be used in original designs. Normal pulse cleaning is used, i.e., no special changes to the cleaning equipment are required. Costs for star-shaped bags and cages are about three to three-and-a-half times normal bags and cages.

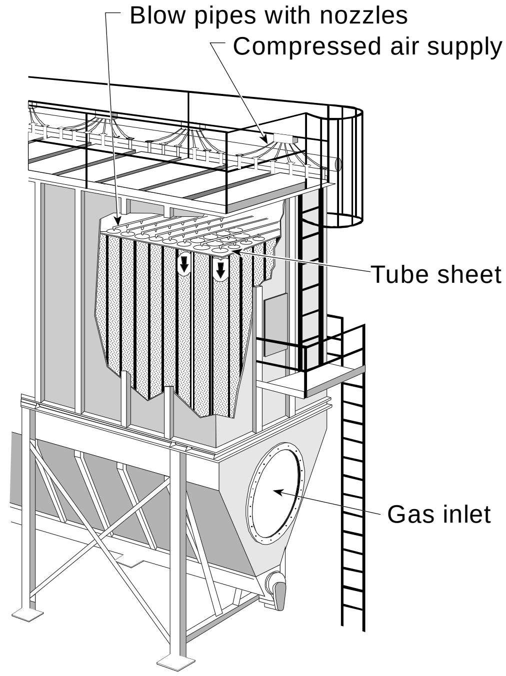


Figure 1.3: Typical Pulse-Jet Baghouse
(Courtesy of North Carolina State University)

1.2.3.2 Cartridge Filters

Further increases in filter area per unit of baghouse volume are obtained by using finely pleated filter media supported on a wire framework. This cartridge can be mounted vertically as a nearly direct replacement for standard bags and cages in existing baghouses, or mounted horizontally in original designs. When used as a direct replacement for standard bags and cages, retrofit costs for one case are 70 % of the cost of building a new baghouse.[6] Cleaning of early cartridge baghouse designs is by typical pulse equipment using a blow pipe across a row of cartridges. More recent designs use individual air valves for each pair of cartridges.

One type of cartridge[7] contains an inner supporting core surrounded by the pleated filter medium and outer supporting mesh. One end of the cartridge is open, which allows gas passing through the filter from the outside to exit to a clean air plenum. Cleaning air is pulsed through the same open end, but in a reverse direction from the gas being cleaned. The other end of the cartridge is closed by an end cap. The manufacturing process requires strong, rigid joints where the end caps attach to the filter medium and cores. Epoxy or polyurethane plastics are used to seal the medium against the end caps. The cartridge is held tightly in place against a mounting plate surrounding the hole that connects it to the clean air plenum. Horizontal cartridges are typically mounted in tandem with a gasket seal between them. If not properly mounted or if the gasket material is not of high quality, leakage will occur after repeated cleaning pulses.

Filter media for cartridges may be paper, spunbonded monofilament plastics (polyester is predominant), or nonwoven fabrics. Cartridges may be from 6 in. to 14 in. in diameter and 16 in. to 36 in. in length. The filtering surface is from about 25 ft^2 to 50 ft^2 for cartridges with nonwoven fabrics, about three to four times as much with spunbondeds, and more than six times as much with paper. A typical cartridge may have 36 ft^2 of nonwoven fabric, 153 ft^2 of spunbonded fabric, or 225 ft^2 of paper. Pleat spacing is important for two reasons: closer spacing increases filter area for a specific cartridge volume, but closer spacing increases the likelihood of dust permanently bridging the bottoms of the pleats and reducing available filtering area. For nonagglomerating dusts of small particle size, (up to a few micrometers) and benign characteristics for paper, the cartridge may have 12 pleats/in. to 16 pleats/in. Nonwovens under more difficult conditions may have 4 pleats/in. to 8 pleats/in. Pleat depth is 1 in. to 3 in. Pleat arrangement and available volume of cleaning air determine the cleanability of the media for a specific dust. An advantage of paper media is their ability to collect particles less than 2.5 µm in diameter with high efficiency. Overall efficiency can be 99.999+ percent. Nonwoven media may be an order of magnitude less efficient. However, even glass fiber bags in reverse-air baghouses on combustion sources can collect 2.5 µm particles with 99.9 percent efficiency.

Cartridge filters are limited in temperature by the adhesives that seal the media to the end caps. Operating temperatures of 200°F are common, with temperature capability to 350°F soon to be marketed. Figure 1.4 illustrates a cartridge collector.

1.2.4 Sonic Cleaning

Because reverse-air cleaning is a low-energy method compared with shaking or pulse-jet cleaning, additional energy may be required to obtain adequate dust removal. Shaking, as described above, is one such means of adding energy, but another is adding vibrational energy in the low end of the acoustic spectrum. Sonic horns powered by compressed air are a typical means of applying this energy. The horns (1 to several per compartment for large baghouses) typically operate in the range of 125 to 550 Hz (more frequently in the 125 to 160 Hz range) and produce sound pressures of 120 to 145 db. When properly applied, sonic energy can reduce the mass of dust on bags considerably, but may also lead to increased dust penetration through the fabric. Increased penetration reduces the efficiency of the baghouse. Sonic horns are effective as supplemental equipment for some applications that require added energy for adequate cleaning, Occasionally sonic horns are used as the only source of cleaning energy.

Horn construction includes a horn-shaped outlet attached to an inlet chamber containing a diaphragm. Compressed air at 45 to 75 psig enters the chamber, vibrates the diaphragm, and escapes through the horn. Sound waves leaving the horn contact and vibrate dust-containing fabric with sufficient energy to loosen or detach patches of dust that fall through the bag to the hopper below. Compressed air consumption varies from 45 to 75 scfm depending on the size of the horn. Horns can be flange mounted through the baghouse siding with the flange at either the outlet end of the horn or at the inlet chamber. The horns also can be suspended inside the baghouse structure.

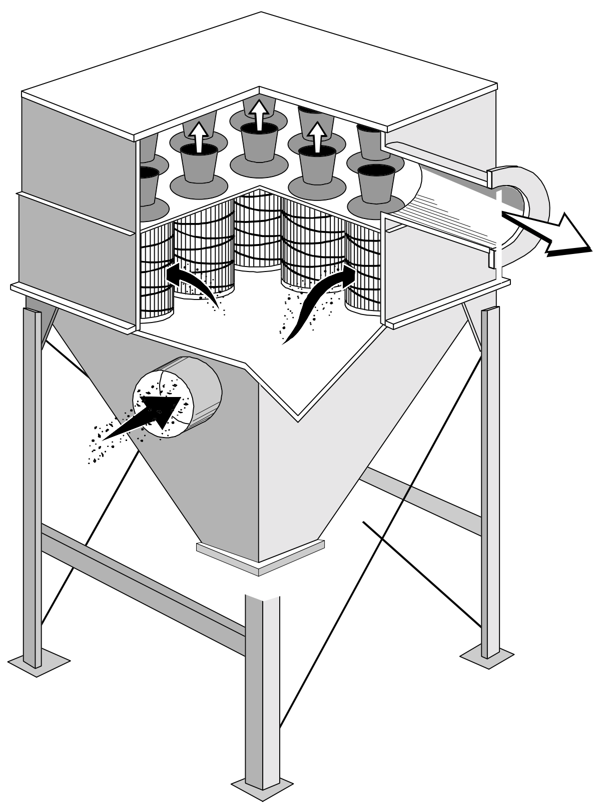


Figure 1.4: Typical Vertical-Mount Cartridge Baghouse
(Courtesy of North Carolina State University)

An example of sonic horn usage is a 10-compartment, reverse-air baghouse cleaning combustion gases at 835,000 acfm. Bags being cleaned are 12 in. in diameter and 35 ft in length. Each compartment has a horn mounted in each of the four corners and angled towards the center of the compartment. Compartments are cleaned every 30 minutes with reverse air for 1 minute and sonic horns for 30 seconds during the reverse-air cleaning. The horns operate at 75 psig and consume 65 scfm of compressed air. For baghouses requiring less intensive cleaning, the cleaning cycle might be extended to 1 hour or more.

For a 6-compartment baghouse requiring 1 horn per compartment, the system investment for horns was $13,500 (the BHA Group). The installed horns operated at 125 Hz and used 75 scfm of compressed air at 75 psig. In this case, each horn cleaned 8,500 ft^2 of fabric. The same size horn can clean up to 15,000 ft^2 of fabric.

1.2.5 Auxiliary Equipment

The typical auxiliary equipment associated with fabric filter systems is shown in Figure 1.5. Along with the fabric filter itself, a control system typically includes the following auxiliary equipment: a capture device (i.e., hood or direct exhaust connection); ductwork; dust removal equipment (screw conveyor, etc.); fans, motors, and starters; and a stack. In addition, spray chambers, mechanical collectors, and dilution air ports may be needed to precondition the gas before it reaches the fabric filter. Capture devices are usually hoods or direct exhaust couplings attached to a process vessel. Direct exhaust couplings are less common, requiring sweep air to be drawn through the process vessel, and may not be feasible in some processes. Ductwork (including dampers) is used to contain, and regulate the flow of, the exhaust stream as it moves from the emission source to the control device and stack. Spray chambers and dilution air ports decrease the temperature of the pollutant stream to protect the filter fabric from excessive temperatures. When a substantial portion of the pollutant loading consists of relatively large particles (more than about 20 µm), mechanical collectors such as cyclones are used to reduce the load on the fabric filter. Fans provide motive power for air movement and can be mounted before (pressure baghouse) or after (suction baghouse) the filter. Stacks, when used, vent the cleaned stream to the atmosphere. Screw conveyors are often used to remove captured dust from the bottom of the hoppers under the fabric filter and (if used) mechanical collector. Air conveying (pneumatic) systems and direct dumping into containers are also used as alternate means for dust removal from the hoppers.

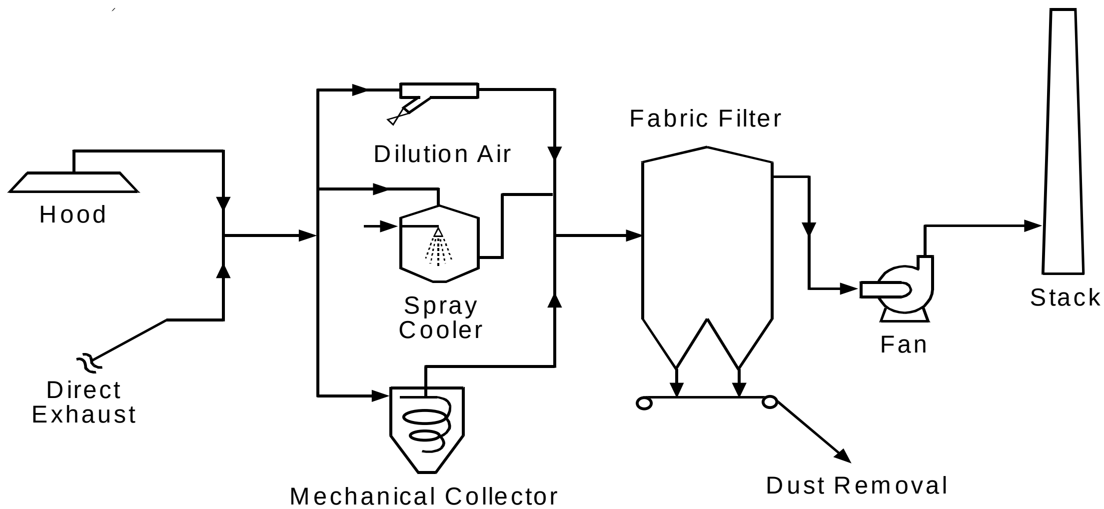


Figure 1.5: Typical alternative auxiliary equipment items used with fabric filter control systems.

1.2.6 Fabric Filtration Theory

The key to designing a baghouse is to determine the face velocity that produces the optimum balance between pressure drop (operating cost that increases as pressure drop increases) and baghouse size (capital cost that decreases as the baghouse size is reduced). Baghouse size is reduced as the face velocity (or gas-to-cloth ratio) is increased. However, higher gas-to-cloth ratios cause higher pressure drops. Major factors that affect design gas-to-cloth ratio, discussed in Section 1.3, include particle and fabric characteristics and gas temperature.

Although collection efficiency is another important measure of baghouse performance, a properly designed and well run baghouse will generally have an extemely high particulate matter (PM) collection efficiency (i.e., 99.9+ percent). Baghouses are particularly effective for collecting small particles. For example, tests of baghouses on two utility boilers[8],[9] showed efficiencies of 99.8 percent for particles 10 µm in diameter and 99.6 percent to 99.9 percent for particles 2.5 µm in diameter. Because high efficiency is assumed, the design process focuses on the pressure drop.

Pressure drop occurs from the flow through inlet and outlet ducts, from flow through the hopper regions, and from flow through the bags. The pressure drop through the baghouse compartment (excluding the pressure drop across the bags) depends largely on the baghouse design and ranges from 1 to 2 inches of H_2O[3] in conventional designs and up to about 3 inches of H_2O in designs having complicated gas flow paths. This loss can be kept to a minimum (i.e., 1 inch of H_2O or less) by investing in a flow modeling study of the proposed design and modifying the design in accordance with the study results. A study of this sort would cost on the order of $70,000 (in 1998).

The pressure drop across the bags (also called the tube-sheet pressure drop) can be as high as 10 inches of H_2O or more. The tube-sheet pressure drop is a complex function of the physical properties of the dust and the fabric and the manner in which the baghouse is designed and operated. The duct and hopper losses for a specific configuration are constant and can be minimized effectively by changing the configuration through proper design based on a knowledge of the flow through the baghouse.[1]

Fabric filtration is a batch process that has been adapted to continuous operation. One requirement for a continuously operating baghouse is that the dust collected on the bags must be removed periodically. Shaker and reverse-air baghouses normally use woven fabric bags, run at relatively low face velocities, and have cake filtration as the major particle removal mechanism. That is, the fabric merely serves as a substrate for the formation of a dust cake that is the actual filtration medium. Pulse-jet baghouses generally use felt fabric and run with a high gas-to-cloth ratio (about double that of shaker or reverse-air baghouses). The felt fabric may play a much more active role in the filtration process. This distinction between cake filtration and fabric filtration has important implications for the rate of pressure loss across the filter bags. The theoretical description and design process for cake filtration is quite different from that for fabric filtration. Fabric selection is aided by bench-scale filtration tests to investigate fabric effects on pressure drop, cake release during cleaning, and collection efficiency. These tests cost less than one-tenth the cost of flow modeling. Electrical properties of the fabric , such as resistivity and triboelectric order (the fabric's position in a series from highly electropositive to highly electronegative as determined from its charge under a specific triboelectrification procedure), may be measured to aid in fabric selection. Although their effects are generally poorly understood, electrical/ electrostatic effects influence cake porosity and particle adhesion to fabrics or other particles.[10][11][12] Knowledge of the effects can lead to selection of fabrics that interact favorably regarding dust collection and cleaning.

The following sections display the general equations used to size a baghouse, beginning with the reverse air/shake deflate type of baghouse.

---

[1]A procedure for estimating duct pressure losses is given in Section 2 ("Hoods, Ductwork, and Stacks") of this Manual.

1.2.6.1 Reverse Air/Shake Deflate Baghouses

The construction of a baghouse begins with a set of specifications including average pressure drop, total gas flow, and other requirements; a maximum pressure drop may also be specified. Given these specifications, the designer must determine the maximum face velocity that can meet these requirements. The standard way to relate baghouse pressure drop to face velocity is given by the relation:

$$\Delta P(\theta) = S_{sys}(\theta) V_{f\ (avg.)} \tag{1.1}$$

where

$\Delta P(\theta)$ = the pressure drop across the filter, a function of time, θ (in. H_2O)
$S_{sys}(\theta)$ = system drag, a function of time [in. H_2O/(ft/min)]
$V_{f\ (avg.)}$ = average (i.e., design) face velocity or G/C, constant (ft/min)

For a multi-compartment baghouse, the system drag, which accounts for most of the drag from the inlet flange to the outlet flange of the baghouse, is determined as a combination of resistances representative of several compartments. For the typical case where the pressure drop through each compartment is the same, and where the filtering area per compartment is equal, it can be shown that:[13]

$$S_{sys}(\theta) = \left[\frac{1}{M} \sum_{i=1}^{M} \frac{1}{S_i(\theta)} \right]^{-1} = \frac{1}{\dfrac{1}{M} \displaystyle\sum_{i=1}^{M} \frac{1}{S_i(\theta)}} = \frac{M}{\displaystyle\sum_{i=1}^{M} \frac{1}{S_i(\theta)}} \tag{1.2}$$

where

M = number of compartments in the baghouse
$S_i(\theta)$ = drag across compartment i

The compartment drag is a function of the amount of dust collected on the bags in that compartment. Dust load varies nonuniformly from one bag to the next, and within a given bag there will also be a variation of dust load from one area to another. For a sufficiently small area, j, within compartment i, it can be assumed that the drag is a linear function of dust load:

$$S_{i,j}(\theta) = S_e + K_2\ W_{i,j}(\theta) \tag{1.3}$$

where

S_e = drag of a dust-free filter bag [in. H_2O/(ft/min)]
K_2 = dust cake flow resistance {[in. H_2O/(ft/min)]/(lb/ft^2)}
$W_{i,j}(\theta)$ = dust mass per unit area of area j in compartment i, "areal density" (lb/ft^2)

If there are N different areas of equal size within compartment i, each with a different drag $S_{i,j}$, then the total drag for compartment i can be computed in a manner analogous to Equation 1.2:

$$S_i(\theta) = \frac{N}{\sum \frac{1}{S_{i,j}(\theta)}} \tag{1.4}$$

The constants S_e and K_2 depend upon the fabric and the nature and size of the dust. The relationships between these constants and the dust and fabric properties are not understood well enough to permit accurate predictions and so must be determined empirically, either from prior experience with the dust/fabric combination or from laboratory measurements. The dust mass as a function of time is defined as:

$$W_{i,j}(\theta) = W_r + \int_0^\theta C_{in} V_{i,j}(\theta) d\theta \tag{1.5}$$

where

W_r = dust mass per unit area remaining on a "clean" bag (lb/ft^2)
C_{in} = dust concentration in the inlet gas (lb/ft^3)
$V_{i,j}(\theta)$ = face velocity through area j of compartment i (ft/min)

The inlet dust concentration and the filter area are assumed constant. The face velocity, (gas-to-cloth ratio) through each filter area j and compartment i changes with time, starting at a maximum value just after clearing and steadily decreasing as dust builds up on the bags. The individual compartment face velocities are related to the average face velocity by the expression:

$$V_{avg} = \frac{\sum_i \sum_j V_{i,j}(\theta) A_{i,j}}{\sum_i \sum_j A_{i,j}} \tag{1.6}$$

$$= \frac{\sum_i \sum_j V_{i,j}(\theta)}{M}$$

(for M compartments with equal area)

Equations 1.1 through 1.6 reveal that there is no explicit relationship between the design face velocity and the tube-sheet pressure drop. The pressure drop for a given design can only be determined by the simultaneous solution of Equations 1.1 through 1.5, with Equation 1.6 as a constraint on that solution. Solving the equations requires an iterative procedure: begin with a known target for the average pressure drop, propose a baghouse design (number of compartments, length of filtration period, etc.), assume a face velocity that will yield that pressure drop, and solve the system of Equations 1.1 through 1.6 to verify that the calculated pressure drop equals the target pressure drop. If not, repeat the procedure with new parameters until the specified face velocity yields an average pressure drop (and maximum pressure drop, if applicable) that is sufficiently close to the design specification. Examples of the iteration procedure's use are given in reference [13].

1.2.6.2 Pulse-Jet Baghouses

The distinction between pulse-jet baghouses using felts and reverse-air and shaker baghouses using woven fabrics is basically the difference between cake filtration and composite dust/fabric filtration (noncake filtration). This distinction is more a matter of convenience than physics, as either type of baghouse can be designed for a specific application. However, costs for the two types will differ depending on application- and size-specific factors. Some pulse jets remain on-line at all times and are cleaned frequently. Others are taken off-line for cleaning at relatively long intervals. The longer a compartment remains on-line without cleaning, the more its composite dust/fabric filtration mechanism changes to cake filtration. Therefore, a complete model of pulse-jet filtration must account for the depth filtration occurring on a relatively clean pulse-jet filter, the cake filtration that inevitably results from prolonged periods on-line, and the transition period between the two regimes. When membrane fabrics are used, filtration takes place primarily at the surface of the membrane, which acts similarly to a cake. The following analysis has not been tested against membrane fabrics.

Besides the question of filtration mechanism, there is also the question of cleaning method. If the conditions of an application require that a compartment be taken off-line for cleaning, the dust removed falls into the dust hopper before forward gas flow resumes. If conditions allow a compartment to be cleaned while on-line, only a small fraction of the dust removed from the bag falls into the hopper. The remainder of the dislodged dust will be redeposited (i.e., "recycled") on the bag by the forward gas flow. The redeposited dust layer has different pressure drop characteristics than the freshly deposited dust. The modeling work that has been done to date focuses on the on-line cleaning method. Dennis and Klemm[14] proposed the following model of drag across a pulse-jet filter:

$$S = S_e \left(K_2\right)_c W_c + K_2 W_o \tag{1.7}$$

where

S	=	drag across the filter
S_e	=	drag of a just-cleaned filter
$(K_2)_c$	=	specific dust resistance of the recycling dust
W_c	=	areal density of the recycling dust
K_2	=	specific dust resistance of the freshly deposited dust
W_o	=	areal density of the freshly deposited dust

This model has the advantage that it can easily account for all three regimes of filtration in a pulse-jet baghouse. As in Equations 1.1 to 1.6, the drag, filtration velocity and areal densities are functions of time, θ. For given operating conditions, however, the values of S_e, $(K_2)_c$, and W_c may be assumed to be constant, so that they can be grouped together:

$$\Delta P = (PE)_{\Delta w} + K_2 W_o V_f \tag{1.8}$$

where

ΔP	=	pressure drop (in. H_2O)
V_f	=	filtration velocity (ft/min)
$(PE)_{\Delta w}$	=	$[S_e + (K_2)_c W_c]V_f$

Equation 1.8 describes the pressure drop behavior of an individual bag. To extend this single bag result to a multiple-bag compartment, Equation 1.7 would be used to determine the individual bag drag and total baghouse drag would then be computed as the sum of the parallel resistances. Pressure drop would be calculated as in Equation 1.1. It seems reasonable to extend this analysis to the case when the dust is distributed unevenly on the bag and then apply Equation 1.7 to each area on the bag, followed by an equation analogous to 1.4 to compute the overall bag drag. The difficulty in following this procedure is that one must assume values for W_c for each different area to be modeled.

The disadvantage of the model represented by Equations 1.7 and 1.8 is that the constants, S_e, $(K_2)_c$, and W_c, cannot be predicted at this time. Consequently, correlations of laboratory data must be used to determine the value of $(PE)_{\Delta w}$. For the fabric-dust combination of Dacron felt and coal fly ash, Dennis and Klemm[14] developed an empirical relationship between $(PE)_{\Delta w}$, the face velocity, and the cleaning pulse pressure. This relationship (converted from metric to English units) is as follows:

$$(PE)_{\Delta w} = 6.08 V_f P_j^{-0.65} \tag{1.9}$$

where

V_f	=	face velocity, (ft/min)
P_j	=	pressure of the cleaning pulse (usually 60 to 100 psig; see Section 5.4.1)

This equation is essentially a regression fit to a limited amount of laboratory data and should not be applied to other dust/fabric combinations. The power law form of Equation 1.9 may not be valid for other dusts or fabrics. Consequently, more data should be collected and analyzed before the model represented by Equation 1.9 can be used for rigorous sizing purposes.

Another model that shows promise in the prediction of noncake filtration pressure drop is that of Leith and Ellenbecker[15] as modified by Koehler and Leith.[16] In this model, the tube-sheet pressure drop is a function of the clean fabric drag, the system hardware, and the cleaning energy. Specifically:

$$\Delta P = \frac{1}{2}\left[P_s + K_1 V_f - \sqrt{\left(P_s - K_1 V_f\right)^2 - 4 W_o \frac{K_2}{K_3}}\right] + K_v V_f^2 \tag{1.10}$$

where

P_s	=	maximum static pressure achieved in the bag during cleaning
K_1	=	clean fabric resistance
V_f	=	face velocity
K_2	=	dust deposit flow resistance
K_3	=	bag cleaning efficiency coefficient
K_v	=	loss coefficient for the venturi at the inlet to the bag

Comparisons of laboratory data with pressure drops computed from Equation 1.10 [15,16] are in close agreement for a variety of dust/fabric combinations. The disadvantage of Equation 1.10 is that the constants K_1, K_2, and K_3 must be determined from laboratory measurements. The most difficult one to mine is the K_3 value, which can only be found by making measurements in a pilot-scale pulse-jet baghouse. A limitation of laboratory measurements is that actual filtration conditions cannot always be adequately simulated. For example, a redispersed dust may not have the same size distribution or charge characteristics as the original dust, thereby yielding different values of K_1, K_2, and K_3 than would be measured in an operating baghouse.

1.3 Design Procedures

The design procedure requires estimating a gas-to-cloth ratio that is compatible with fabric selection and cleaning type. Fabric selection for composition depends on gas and dust characteristics; fabric selection for construction (woven or felt) largely depends on type of cleaning. Estimating a gas-to-cloth ratio that is too high, compared to a correctly estimated gas-to-cloth ratio, leads to higher pressure drops, higher particle penetration (lower collection efficiency), and more frequent cleaning that leads to reduced fabric life. Estimating a gas-to-cloth ratio that is too low increases the size and cost of the baghouse unnecessarily. Each of the parameters for design is discussed below.

1.3.1 Gas-to-Cloth Ratio

The gas-to-cloth ratio is difficult to estimate from first principles. However, shortcut methods of varying complexity allow rapid estimation. Three methods of increasing difficulty follow. For shaker and reverse-air baghouses, the third method is best performed with publicly available computer programs. Although pulse-jet baghouses have taken a large share of the market, they are not necessarily the least costly type for a specific application. Costing should be done for pulse-jet baghouses at their application-specific gas-to-cloth ratios and for reverse-air or shaker baghouses at their application-specific gas-to-cloth ratios.

The methods outlined below pertain to conventional baghouses. Use of electrostatic stimulation may allow a higher gas-to-cloth ratio at a given pressure drop; thus a smaller baghouse structure and fewer bags are needed. Viner and Locke[17] discuss cost and performance models for electrostatically stimulated fabric filters; however, no data are available for full-scale installations. Use of extended area bag configurations (star-shaped bags or pleated media cartridges) do not allow significant changes in gas-to-cloth ratios, but do allow installation of more fabric in a given volume.

1.3.1.1 Gas-to-Cloth Ratio From Similar Applications

After a fabric has been selected, an initial gas-to-cloth ratio can be determined using Table 1.1. Column 1 shows the type of dust; column 2 shows the gas-to-cloth ratios for woven fabric; and column 3 shows gas-to-cloth ratios for felted fabrics. Notice that these values are all “net” gas-to-cloth ratios, equal to the total actual volumetric flow rate in cubic feet per minute divided by the net cloth area in square feet. This ratio, in units of feet per minute, affects pressure drop and bag life as discussed in Section 1.2. The net cloth area is determined by dividing the exhaust gas flow rate in actual cubic feet per minute (acfm) by the design gas-to-cloth ratio. For an intermittent-type baghouse that is shut down for cleaning, the net cloth area is also the total, or gross, cloth area. However, for continuously operated shaker and reverse-air filters, the area must be increased to allow the shutting down of one or more compartments for cleaning. Continuously operated, compartmented pulse-jet filters that are cleaned off line also require additional cloth to maintain the required net area when cleaning. Table 1.2 provides a guide for adjusting the net area to the gross area, which determines the size of a filter requiring off-line cleaning.

1.3.1.2 Gas-to-Cloth Ratio From Manufacturer's Methods

Manufacturers have developed nomographs and charts that allow rapid estimation of the gas-to-cloth ratio. Two examples are given below, one for shaker-cleaned baghouses and the other for pulse-jet cleaned baghouses.

For shaker baghouses, Table 1.3 gives a factor method for estimating the ratio. Ratios for several materials in different operations are presented, but are modified by factors for particle size and dust load. Directions and an example are included. Gas-to-cloth ratios for reverse-air baghouses would be about the same or a little lower compared to the Table 1.3 values.

Table 1.1: Gas-to-Cloth Ratios for Baghouse/Fabric Combinations[a,b] (actual ft^3/min)/(ft^2 of net cloth area)

Dust	Shaker/Woven Fabric Reverse-Air/Woven Fabric	Pulse Jet/Felt Fabric Reverse-Air/Felt Fabric
Alumina	2.5	8
Asbestos	3.0	10
Bauxite	2.5	8
Carbon Black	1.5	5
Coal	2.5	8
Cocoa, Chocolate	2.8	12
Clay	2.5	9
Cement	2.0	8
Cosmetics	1.5	10
Enamel Frit	2.5	9
Feeds, Grain	3.5	14
Feldspar	2.2	9
Fertilizer	3.0	8
Flour	3.0	12
Fly Ash	2.5	5
Graphite	2.0	5
Gypsum	2.0	10
Iron Ore	3.0	11
Iron Oxide	2.5	7
Iron Sulfate	2.0	6
Lead Oxide	2.0	6
Leather Dust	3.5	12
Lime	2.5	10
Limestone	2.7	8
Mica	2.7	9
Paint Pigments	2.5	7
Paper	3.5	10
Plastics	2.5	7
Quartz	2.8	9
Rock Dust	3.0	9
Sand	2.5	10
Sawdust (Wood)	3.5	12
Silica	2.5	7
Slate	3.5	12
Soap, Detergents	2.0	5
Spices	2.7	10
Starch	3.0	8
Sugar	2.0	13
Talc	2.5	5
Tobacco	3.5	
Zinc Oxide	2.0	

[a]Reference[18]

[b]Generally safe design values; application requires consideration of particle size and grain loading.

Table 1.2: Approximate Guide to Estimate Gross Cloth Area From Net Cloth Area[a]

Net Cloth Area (ft^2)	Multiplier to Obtain Gross Cloth Area (ft^2)	
1-4,000	Multiply by	2
4,001-12,000	"	1.5
12,001-24,000	"	1.25
24,001-36,000	"	1.17
36,001-48,000	"	1.125
48,001-60,000	"	1.11
60,001-72,000	"	1.10
72,001-84,000	"	1.09
84,001-96,000	"	1.08
96,001-108,000	"	1.07
108,001-132,000	"	1.06
132,001-180,000	"	1.05
above 180,001	"	1.04

[a]Reference[19]

For pulse-jet baghouses, which normally operate at two or more times the gas-to-cloth ratio of reverse-air baghouses, another factor method[20] has been modified with equations to represent temperature, particle size, and dust load:

$$V = 2.878 \; A \; B \; T^{-0.2335} L^{-0.06021} \left(0.7471 + 0.0853 \ln D\right) \tag{1.11}$$

where

V	=	gas-to-cloth ratio (ft/min)
A	=	material factor, from Table 5.4
B	=	application factor, from Table 5.4
T	=	temperature, (°F, between 50 and 275)
L	=	inlet dust loading (gr/ft^3, between 0.05 and 100)
D	=	mass mean diameter of particle (μm, between 3 and 100)

For temperatures below 50°F, use T = 50 but expect decreased accuracy; for temperatures above 275°F, use T = 275. For particle mass mean diameters less than 3 μm, the value of D is 0.8, and for diameters greater than 100 μm, D is 1.2. For dust loading less than 0.05 gr/ft^3, use L = 0.05; for dust loading above 100 gr/ft^3, use L = 100. For horizontal cartridge baghouses, a similar factor method can be used. Table 1.5 provides the factors.

Table 1.3: Manufacturer's Factor Method for Estimating Gas-to-cloth Ratios for Shaker Baghouses

A

4/1 RATIO		3/1 RATIO		2.5/1 RATIO		2/1 RATIO		1.5/1 RATIO	
Material	**Operation**	**Material**	**Operation**	**Material**	**Operation**	**Material**	**Operation**	**Material**	**Operation**
Cardboard	1	Asbestos	1, 7, 8	Alumina	2, 3, 4, 5, 6	Ammonium		Activated Carbon	2, 4, 5, 6, 7
Feeds	2, 3, 4, 5, 6, 7	Aluminum Dust	1, 7, 8	Carbon Black	4, 5, 6, 7	Phosphate		Carbon Black	11, 14
Flour	2, 3, 4, 5, 6, 7	Fibrous Mat'l	1, 4, 7, 8	Cement	3, 4, 5, 6, 7	Fertilizer	2, 3, 4, 5, 6, 7	Detergents	2, 4, 5, 6, 7
Grain	2, 3, 4, 5, 6, 7	Cellulose Mat'l	1, 4, 7, 8	Coke	2, 3, 5, 6	Diatomaceous		Metal Fumes,	
Leather Dust	1, 7, 8	Gypsum	1, 3, 5, 6, 7	Ceramic Pigm.	4, 5, 6, 7	Earth	4, 5, 6, 7	Oxides and	
Tobacco	1, 4, 6, 7	Lime (Hydrated)	2, 4, 6, 7	Clay and		Dry Petrochem.	2, 3, 4, 5, 6, 7, 14	other Solid	
Supply Air	13	Perlite	2, 4, 5, 6	Brick Dust	2, 4, 6, 12	Dyes	2, 3, 4, 5, 6, 7	Dispersed	
Wood, Dust,		Rubber Chem.	4, 5, 6, 7, 8	Coal	2, 3, 6, 7, 12	Fly Ash	10	Products	10, 11
Chips	1, 6, 7	Salt	2, 3, 4, 5, 6, 7	Kaolin	4, 5, 7	Metal Powders	2, 3, 4, 5, 6, 7, 14		
		Sand*	4, 5, 6, 7, 9, 15	Limestone	2, 3, 4, 5, 6, 7	Plastics	2, 3, 4, 5, 6, 7, 14		
		Iron Scale	1, 7, 8	Rock, Ore Dust	2, 3, 4, 5, 6, 7	Resins	2, 3, 4, 5, 6, 7, 14		
		Soda Ash	4, 6, 7	Silica	2, 3, 4, 5, 6, 7	Silicates	2, 3, 4, 5, 6, 7, 14		
		Talc	3, 4, 5, 6, 7	Sugar	3, 4, 5, 6, 7	Starch	6, 7		
		Machining				Soaps	3, 4, 5, 6, 7		
		Operation	1, 8						

CUTTING - 1	MIXING - 4	CONVEYING - 7	FURNACE FUME - 10	INTAKE CLEANING - 13
CRUSHING - 2	SCREENING - 5	GRINDING - 8	REACTION FUME - 11	PROCESS - 14
PULVERIZING - 3	STORAGE - 6	SHAKEOUT - 9	DUMPING - 12	BLASTING - 15

B — **FINENESS FACTOR**

C — **DUST LOAD FACTOR**

Micron Size	Factor	Loading gr/cu ft	Factor
> 100	1.2	1 - 3	1.2
50 - 100	1.1	4 - 8	1.0
10 - 50	1.0	9 - 17	0.95
3 - 10	0.9	18 - 40	0.90
1 - 3	0.8	> 40	0.85
< 1	0.7		

This information constitutes a guide for commonly encountered situations and should not be considered a "hard-and-fast" rule. Air-to-cloth ratios are dependent on dust loading, size distribution, particle shape and "cohesiveness" of the deposited dust. These conditions must be evaluated for each application. The larger the interval between bag cleaning the lower the air-to-cloth ratio must be. Finely-divided, uniformly sized particles generally form more dense filter cakes and require lower air-to-cloth ratios than when larger particles are interspersed with the fines. Sticky, oily particles, regardless of shape and size, form dense filter cakes and require lower air-to-cloth ratios.

Example: Foundry shakeout unit handling 26,000 CFM and collecting 3,500 lb/hr of sand. The particle distribution shows 90% greater than 10 microns. The air is to exhaust to room in winter, to atmosphere in summer.

$$3{,}500\,\frac{lb}{hr} \div 60\,\frac{\min}{hr} \div 26{,}000\,\frac{ft^3}{\min} \times 7{,}000\,\frac{gr}{lb} = 15.7\,\frac{gr}{ft^3}$$

*Chart A = 3/1 ratio, Chart B = Factor 1.0, Chart C = 0.95; 3 x 1 x 0.95 = 2.9 air-to-cloth ratio.
26,000 / 2.9 = 9,000 sq. ft.

Reprinted with permission from Buffalo Forge Company Bulletin AHD-29

Table 1.4: Factors for Pulse-Jet Gas-to-Cloth Ratios[a]

A. Material Factor

15[b]	12	10	9.0	6.0[c]
Cake mix	Asbestos	Alumina	Ammonium	Activated
Cardboard	Buffing dust	Aspirin	phosphate-	carbon
dust	Fiborous and	Carbon black	fertilizer	Carbon black
Cocoa	cellulosic	(finished)	Cake	(molecular)
Feeds	material	Cement	Diatomaceous	Detergents
Flour	Foundary	Ceramic	earth	Fumes and
Grain	shakeout	pigments	Dry petro-	other dispersed
Leather	Gypsum	Clay and brick	chemicals	products direct
dust	Lime	dusts	Dyes	from reactions
Sawdust	(hydrated)	Coal	Fly ash	Powdered milk
Tobacco	Perlite	Fluorspar	Metal powder	Soap
	Rubber	Gum, natural	Metal oxides	
	chemicals	Kaolin	Pigments	
	Salt	Limestone	metallic end	
	Sand	Perchlorates	synthetic	
	Sandblast	Rock dust, ores	Plastics	
	dust	and minerals	Resins	
	Soda ash	Silica	Silicates	
	Talc	Sorbic acid	Starch	
		Sugar	Stearates	
			Tannic acid	

B. Application Factor

Nuisance Venting Relief of transfer points, conveyors, packing stations, etc.	1.0
Product Collection Air conveying-venting, mills, flash driers, classifiers, etc.	0.9
Process Gas Filtration Spray driers, kilns, reactors, etc.	0.8

[a]Reference [20]

[b]In general, physically and chemically stable material.

[c]Also includes those solids that are unstable in their physical or chemical state due to hygroscopic nature, sublimation, and/or polymerization.

1.3.1.3 Gas-to-Cloth Ratio From Theoretical/Empirical Equations

Shaker and reverse-air baghouses The system described by Equations 1.1 through 1.6 is complicated; however, numerical methods can be used to obtain an accurate solution. A critical weakness in baghouse modeling that has yet to be overcome is the lack of a fundamental description of the bag cleaning process. That is, to solve Equations 1.1 through 1.6, the value of W_r (the dust load after cleaning) must be known. Clearly, there must be a relationship between the amount and type of cleaning energy and the degree of dust removal from a bag. Dennis et al.[13] have developed correlations for the removal of coal fly ash from woven fiberglass bags by shaker cleaning and by reverse-air cleaning. These correlations have been incorporated into a computer program that generates the solution to the above system of equations.[14],[21],[22] If one were to apply the correlations developed with coal ash and woven glass fabrics to other dust/fabric combinations, the accuracy of the results would depend on how closely that dust/fabric combination mimicked the coal ash/woven glass fabric system.

Physical factors that affect the correlation include the particle size distribution, adhesion and electrostatic properties of the dust and fabric, and fabric weave, as well as cleaning energy. More research is needed in this area of fabric filtration.

The rigorous design of a baghouse thus involves several steps. First, the design goal for average pressure drop (and maximum pressure drop, if necessary) must be specified along with total gas flow rate and other parameters, such as S_e and K_2 (obtained either from field or laboratory measurements). Second, a face velocity is assumed and the number of compartments in the baghouse is computed based on the total gas flow, face velocity, bag size, and number of bags per compartment. (Typical compartments in the U.S. electric utility industry use bags 1 ft in diameter by 30 ft in length with 400 bags per compartment.) Standard practice is to design a baghouse to meet the specified pressure drop when one compartment is off-line for maintenance. The third step is to specify the operating characteristics of the baghouse (i.e., filtration period, cleaning period, and cleaning mechanism). Fourth, the designer must specify the cleaning efficiency so that the residual dust load can be estimated. Finally, the specified baghouse design is used to establish the details for Equations 1.1 through 1.6, which are then solved numerically to establish the pressure drop as a function of time. The average pressure drop is then computed by integrating the instantaneous pressure drop over the filtration cycle and dividing by the cycle time. If the computed average is higher than the design specification, the face velocity must be reduced and the procedure repeated. If the computed average pressure drop is significantly lower than the design specification, the proposed baghouse was oversized and should be made smaller by increasing the face velocity and repeating the procedure. When the computed average pressure drop comes sufficiently close to the assumed specified value, the design has been determined. A complete description of the modeling process can be found in the reports by Dennis et al.[13,22] A critique on the accuracy of the model is presented by Viner et al.[23]

Pulse-jet baghouses The overall process of designing a pulse jet baghouse is actually simpler than that required for a reverse-air or shaker baghouse if the baghouse remains on-line for cleaning. The first step is to specify the desired average tube-sheet pressure drop. Second, the operating characteristics of the baghouse must be established (e.g., on-line time, cleaning energy). Third, the designer must obtain values for the coefficients in either Equation 1.9 or Equation 1.10 from field, pilot plant, or laboratory measurements. Fourth, a value is estimated for the face velocity and the appropriate equation (Equation 1.8 or 1.10) is solved for the pressure drop as a function of time for the duration of the filtration cycle. This information is used to calculate the cycle average pressure drop. If the calculated pressure drop matches the specified pressure drop, the procedure is finished. If not, the designer must adjust the face velocity and repeat the procedure.

Table 1.5: Manufacturer's Factor Method for Estimating Gas-to-Cloth Ratio for Horizontal Cartridge Baghouses

Factor A Table for Selected Materials

	2.5	2.1	1.9	1.3	Dust Sample Required
MATERIALS	Rock dust and ores Salt, Mineral[a] Sand (Not foundry)	Activated carbon Alumina (transfer) Cake Mix[a] Carbon black (finished) Ceramic pigment Coal Coke Diatomaceous earth Flour Fluorspar Fly ash Foundry shakeout Gypsum Lime, hydrated Limestone Paint, electrstatic spray (powder coating) Petrochemicals (dry) Pigments, metallic, synthetic Plaster Rubber additives Silicates Soda ash Starch Sugar[a] Welding fumes	Fertilizers[a] Talc	Alumina (air lift) Dyes Fumes, metallurgical Pigments, paint Stearates	Detergents Feeds Grains Perlite Pharmaceuticals Powdered milk Resins Soap Tobacco
			1.7	**0.7**	**Excluded dusts**
			Aspirin Cement Clay & brick dust Cocoa[a] Coffee[a] Graphite Kaolin Metal oxides Metal powder Perchlorates Selenium Silica (flour)	Silica (fume)	Asbestos Arc washing Fiberglass Fibrous and cellulosic materials Leather Metallizing Mineral Wool P.C. board grinding Paper dust Particle board Sawdust

[a] Under controlled humidity (40 %R.H.) And room temperature only.

The approximate gas-to-cloth (G/C) ratio for a Mikropul horizontal cartridge collector in acfm per square foot of filter area is obtained by multiplying the following five factors: G/C = A x B x C x D x E

For example, G/C for process gas filtration of 10 µm rock dust at 250 °F and 2 gr/acf = 2.5 x 0.8 x 0.75 x 0.9 x 1.1 = 1.49.

Courtesy of Hosokawa Mikropul

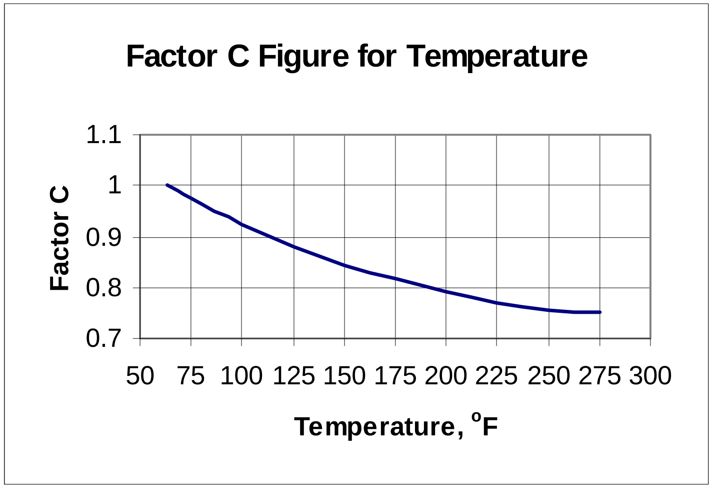
Table 1.5: (Cont.)

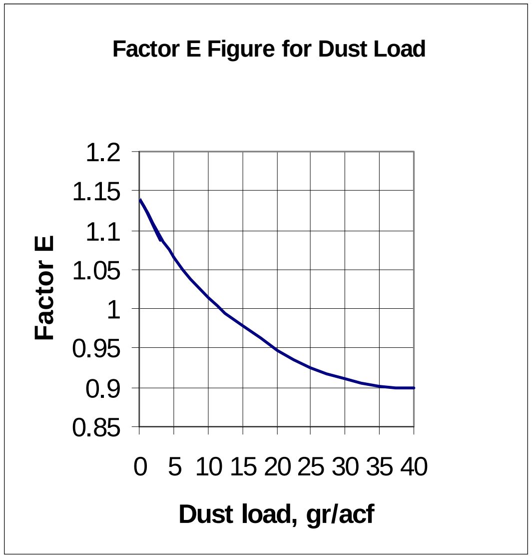
Factor B Table for Applications

Application	Factor B
Nuisance Venting Relief of transfer points, conveyors, packing stations, etc.	1.0
Product Collection Air conveying-venting, mills, flash driers, classifiers, etc.	0.9
Process Gas Filtration Spray driers, kilns, reactors, etc	0.8

Factor D Table for Dust Fineness

Fineness	Factor D
Over 50 µm	1.1
20 - 50 µm	1.0
2-20 µm	0.9
Under 2 µm	0.85





Courtesy of Hosokawa Mikropul

1.3.2 Pressure Drop

Pressure drop for the bags can be calculated from the equations given in the preceding section if values for the various parameters are known. Frequently they are not known, but a maximum pressure drop of 5 to 10 in. H_2O across the baghouse and 10 to 20 in. H_2O across the entire system can be assumed if it contains much ductwork.

A comparable form of Equations 1.1 and 1.3 that may be used for estimating the maximum pressure drop across the fabric in a shaker or reverse-air baghouse is:

$$\Delta P = S_e V + K_2 C_i V^2 \theta \tag{1.12}$$

where

ΔP	=	pressure drop (in. H_2O)
S_e	=	effective residual drag of the fabric [in. H_2O/(ft/min)]
V	=	superficial face velocity or gas-to-cloth ratio (ft/min)
K_2	=	specific resistance coefficient of the dust {[in. H_2O/(ft/min)]/(lb /ft^2)}
C_i	=	inlet dust concentration (lb/ft^3)
θ	=	filtration time (min)

Although there is much variability, values for S_e may range from about 0.2 to 2 in. H_2O/(ft/min) and for K_2 from 1.2 to 30–40 in. H_2O/(ft/min)]/(lb/ft^2). Typical values for coal fly ash are about 1 to 4. Inlet concentrations vary from less than 0.05 gr/ft^3 to more than 100 gr/ft^3, but a more nearly typical range is from about 0.5 to 10 gr/ft^3. Filtration times may range from about 20 to 90 minutes for continuous duty baghouses, but 30 to 60 minutes is more frequently found. For pulse-jet baghouses, use Equations 1.8 and 1.9 to estimate ΔP, after substituting $C_i V \theta$ for W_o and $(PE)_{\Delta w}$ for $S_e V$.

1.3.3 Particle Characteristics

Particle size distribution and adhesiveness are the most important particle properties that affect design procedures. Smaller particle sizes can form a denser cake, which increases pressure drop. As shown in Tables 1.3 and 1.5 and Equation 1.11, the effect of decreasing average particle size is a lower applicable gas-to-cloth ratio.

Adhering particles, such as oily residues or electrostatically active plastics, may require installing equipment that injects a precoating material onto the bag surface, which acts as a buffer that traps the particles and prevents them from blinding or permanently plugging the fabric pores. Informed fabric selection may eliminate electrostatic problems.

1.3.4 Gas Stream Characteristics

Moisture and corrosives content are the major gas stream characteristics requiring design consideration. The baghouse and associated ductwork should be insulated and possibly heated if condensation may occur. Both the structural and fabric components must be considered, as either may be damaged. Where structural corrosion is likely, stainless steel substitution for mild steel may be required, provided that chlorides are not present when using 300 series stainless. (Most austenitic stainless steels are susceptible to chloride corrosion.)

1.3.4.1 Temperature

The temperature of the pollutant stream must remain above the dew point of any condensables in the stream. If the temperature can be lowered without approaching the dew point, spray coolers or dilution air can be used to drop the temperature so that the temperature limits of the fabric will not be exceeded. However, the additional cost of a precooler will have to be weighed against the higher cost of bags with greater temperature resistance. The use of dilution air to cool the stream also involves a tradeoff between a less expensive fabric and a larger filter to accommodate the additional volume of the dilution air. Generally, precooling is not necessary if temperature and chemical resistant fabrics are available. (Costs for spray chambers, quenchers, and other precoolers are found in the "Wet Scrubbers" section of the Manual) Table 1.6 lists several of the fabrics in current use and provides information on temperature limits and chemical resistance. The column labeled "Flex Abrasion" indicates the fabric's suitability for cleaning by mechanical shakers.

1.3.4.2 Pressure

Standard fabric filters can be used in pressure or vacuum service but only within the range of about ± 25 inches of water. Because of the sheet metal construction of the house, they are not generally suited for more severe service. However, for special applications, high-pressure shells can be built.

Table 1.6: Properties of Leading Fabric Materials[a]

Fabric	Temp °F[b]	Acid Resistance	Alkali Resistance	Flex Abrasion
Cotton	180	Poor	Very good	Very good
Creslan[c]	250	Good in mineral	Good in weak acids	Good to very good alkali
Dacron[d]	275	Good in most mineral acids; dissolves partially in concentrated H_2SO_4	Good in weak alkali; fair in strong alkali	Very good
Dynel[e]	160	Little effect even in high concentration	Little effect even in high concentration	Fair to good
Fiberglas[f]	500	Fair to good	Fair to good	Fair
Filtron[e]	270	Good to excellent	Good	Good to very good
PTFE membrane	Depends on backing	Depends on backing	Depends on backing	Fair
Nextel[g]	1,400	Very good	Good	Good
Nomex[d]	375	Fair	Excellent at low temperature	Excellent
Nylon[d]	200	Fair	Excellent	Excellent
Orlon[d]	260	Good to excellent in mineral acids	Fair to good in weak alkali	Good
P84[h]	475	Good	Good	Good
Polypropylene	200	Excellent	Excellent	Excellent
Ryton[i]	375	Excellent	Excellent	Good
Teflon[d]	450	Inert except to fluorine	Inert except to trifluoride, chlorine, and molten alkaline metals	Fair
Wool	200	Very good	Poor	Fair to good

[a]Reference [24]
[b]Maximum continuous operating temperatures recommended by the Institute of Clean Air Companies.
[c]American Cyanamid registered trademark.
[d]Du Pont registered trademark.
[e]W. W. Criswell Div. of Wheelabrator-Fry, Inc. trade name.
[f]Owens-Corning Fiberglas registered trademark.
[g]3M Company registered trademark
[h]Inspec Fibres registered trademark
[i]Phillips Petroleum Company registered trademark

1.3.5 Equipment Design Considerations

1.3.5.1 Pressure or Suction Housings

The location of the baghouse with respect to the fan in the gas stream affects the capital cost. A suction-type baghouse, with the fan located on the downstream side of the unit, must withstand high negative pressures and therefore must be more heavily constructed and reinforced than a baghouse located downstream of the fan (pressure baghouse). The negative pressure in the suction baghouse can result in outside air infiltration, which can result in condensation, corrosion, or even explosions if combustible gases are being handled. In the case of toxic gases, this inward leakage can have an advantage over the pressure-type baghouse, where leakage is outward. The main advantage of the suction baghouse is that the fan handling the process stream is located at the clean-gas side of the baghouse. This reduces the wear and abrasion on the fan and permits the use of more efficient fans (backward-curved blade design). However, because for some designs the exhaust gases from each compartment are combined in the outlet manifold to the fan, locating compartments with leaking bags may be difficult and adds to maintenance costs. Pressure-type baghouses are generally less expensive because the housing must only withstand the differential pressure across the fabric. In some designs the baghouse has no external housing. Maintenance also is reduced because the compartments can be entered and leaking bags can be observed while the compartment is in service. With a pressure baghouse, the housing acts as the stack to contain the fumes with subsequent discharge through long ridge vents (monitors) at the roof of the structure. This configuration makes leaking bags easier to locate when the plume exits the monitor above the bag. The main disadvantage of the pressure-type baghouse in that the fan is exposed to the dirty gases where abrasion and wear on the fan blades may become a problem.

1.3.5.2 Standard or Custom Construction

The design and construction of baghouses are separated into two groups, standard and custom.[19] Standard baghouses are further separated into low, medium, and high capacity size categories. Standard baghouses are predesigned and factory built as complete off-the-shelf units that are shop-assembled and bagged for low-capacity units (hundreds to thousands of acfm throughput). Medium-capacity units (thousands to less than 100,000 acfm) have standard designs, are shop-assembled, may or may not be bagged, and have separate bag compartment and hopper sections. One form of high-capacity baghouses is the shippable module (50,000 to 100,000 acfm), which requires only moderate field assembly. These modules may have bags installed and can be shipped by truck or rail. Upon arrival, they can be operated singly or combined to form units for larger-capacity applications. Because they are preassembled, they require less field labor.

Custom baghouses, also considered high capacity, but generally 100,000 acfm or larger, are designed for specific applications and are usually built to specifications prescribed by the customer. Generally, these units are much larger than standard baghouses. For example, many are used on power plants. The cost of the custom baghouse is much higher per square foot of fabric because it is not an off-the-shelf item and requires special setups for manufacture and expensive field labor for assembly upon arrival. The advantages of the custom baghouse are many and are usually directed towards ease of maintenance, accessibility, and other customer preferences. In some standard baghouses, a complete set of bags must be replaced in a compartment at one time because of the difficulty in locating and replacing single leaking bags, whereas in custom baghouses, single bags are accessible and can be replaced one at a time as leaks develop.

1.3.5.3 Filter Media

The type of filter material used in baghouses depends on the specific application and the associated chemical composition of the gas, operating temperature, dust loading, and the physical and chemical characteristics of the particulate. Selection of a specific material, weave, finish, or weight is based primarily on past experience. For woven fabrics, the type of yarn (filament, spun, or staple), the yarn diameter, and twist are also factors in the selection of suitable fabrics for a specific application. Some applications are difficult, i.e., they have small or smooth particles that readily penetrate the cake and fabric, or have particles that adhere strongly to the fabric and are difficult to remove, or have some other characteristic that degrades particle collection or cleaning. For some of these applications Gore-Tex, a polytetrafluoroethylene (PTFE) membrane laminated to a fabric backing (felt or woven) may be used. Backing materials are chosen to be compatible with the application for which they are used. Other PTFE membrane laminated fabrics are supplied by Tetratec (Tetratex) and BHA (BHA-Tex). These membranes, because of their small pores (1 or 2 µm to less than 1 µm) are advantageous in being able to collect small particles almost immediately after filtration begins. In contrast, woven fabrics and nonwovens, (with pores about 10 µm to 100 µm) allow particles to penetrate the filter for a short time before the cake covering the fabric is reconstituted. Overall mass collection efficiency for a baghouse with membrane bags may not appear to be greater than a baghouse with other fabrics, but the efficiency may be greater for fine particles. For applications able to use paper media, cartridge filters can be particularly effective for particles in the submicron range.

Because of the violent agitation of mechanical shakers, spun or heavy weight staple yarn fabrics are commonly used with this type of cleaning, while lighter weight filament yarn fabrics are used with the gentler reverse air cleaning. Needlepunched felts are typically used for pulse-jet baghouses. These heavier fabrics are more durable than wovens when subjected to cleaning pulses. Woven fiberglass bags are an exception for high-temperature application, where they compete successfully, on a cost basis, against felted glass and other high temperature felts.

The type of material limits the maximum operating gas temperature for the baghouse. Cotton fabric has the least resistance to high temperatures (about 180°F), while of the commonly used fabrics, Fiberglas has the most (about 500°F).[2] If condensibles are contained in the gas stream, its temperature must be well above the dew point because liquid particles will usually plug the fabric pores within minutes or hours. However, the temperature must be below the maximum limit of the fabric in the bags. These maximum limits are given in Table 1.6.

1.4 Estimating Total Capital Investment

Total capital investment includes costs for the baghouse structure, the initial complement of bags, auxiliary equipment, and the usual direct and indirect costs associated with installing or erecting new structures. These costs are described below. (Costs for improving baghouse performance with electrical enhancement are not discussed in this section, but are mentioned in the example problem.)

1.4.1 Equipment Cost

1.4.1.1 Bare Baghouse Costs

Correlations of cost with fabric area for seven types of baghouses are presented. These seven types, six of which are preassembled and one, field-assembled, are listed in Table 1.7.

Table 1.7: List of cost curves for seven baghouse types

	Baghouse Type	**Figure No.**
	Preassembled Units	
Intermittent	Shaker (intermittent)	1.6
Continuous	Shaker (modular)	1.7
Continuous	Pulse-jet (common housing)	1.8
Continuous	Pulse-jet (modular)	1.9
Continuous	Pulse-jet (cartridge)	1.10
Continuous	Reverse-air	1.11
	Field-assembled Units	
Continuous	Any method	1.12

Each figure displays costs for a baghouse type and for additional cost items.[3] All curves are based on vendor quotes. A regression line has been fitted to the quotes and its equation is

[2]Technically, Nextel can withstand even higher temperatures—up to 1400°F. However, at approximately \$15 to \$20/ft^2, its price reserves its use for the relatively small number of cases in which filtration is required at temperatures above 550°F. A less expensive version of the fabric, with temperature capability to about 900EF, may be available.

given. In most cases these lines should not be extrapolated beyond the limits shown. If the reader obtains vendor quotes, they may differ from these curves by as much as ± 25%. All estimates include inlet and exhaust manifold supports, platforms, handrails, and hopper discharge devices. The indicated prices are flange to flange. The reader should note that the scale of each figure changes to accommodate the different gas flow ranges over which the various types of baghouses operate.

The 304 stainless steel add-on cost is used when such construction is necessary to prevent the exhaust gas stream from corroding the interior of the baghouse. Stainless steel is substituted for all metal surfaces that are in contact with the exhaust gas stream.

Insulation costs represent 3 inches of shop-installed glass fiber encased in a metal skin, except for custom baghouses, which have field-installed insulation. Costs for insulation include only the flange-to-flange baghouse structure on the outside of all areas in contact with the exhaust gas stream. Insulation for ductwork, fan casings, and stacks must be calculated separately as discussed later.

Figure 1.6 represents an intermittent service baghouse cleaned by a mechanical shaker.[24] This baghouse is suitable for operations that require infrequent cleaning. It can be shut down and cleaned at convenient times, such as the end of the shift or end of the day. Figure 1.6 presents the baghouse cost as a function of required fabric area. Because intermittent service baghouses do not require an extra compartment for cleaning, gross and net fabric areas are the same. The plot is linear because baghouses are made up of modular compartments and thus have little economy of scale.

Figure 1.7 presents costs for a continuously operated modular baghouse cleaned by mechanical shaker.[24] Again, price is plotted against the gross cloth area in square feet. Costs for these units, on a square foot basis, are higher than for intermittent shaker baghouses because of increased complexity and generally heavier construction.

Figures 1.8 and 1.9 show [24] common-housing and modular pulse-jet baghouses, respectively. Common housing units have all bags within one housing; modular units are constructed of separate modules that may be arranged for off-line cleaning. Note that in the single-unit (common-housing) pulse jet, for the range shown, the height and width of the unit are constant and the length increases; thus, for a different reason than that for the modular units discussed above, the cost increases linearly with size. Because the common housing is relatively inexpensive, the stainless steel add-on is proportionately higher than for modular units. Added material costs and setup and labor charges associated with the less workable stainless steel

[3]Costs in Figures 1.6 to 1.12 are in second quarter 1998 dollars. For information on escalating these prices to more current dollars, refer to the EPA report Escalation Indexes for Air Pollution Control Costs and updates thereto, all of which are installed on the OAQPS Technology Transfer Network at http://www.epa.gov/ttn/catc.

account for most of the added expense. Figure 1.10 shows costs for cartridge baghouses cleaned by pulse.

Figures 1.11 and 1.12 show costs for modular and custom-built reverse-air baghouses, respectively.[24] The latter units, because of their large size, must be field assembled. They are often used on power plants, steel mills, or other applications too large for the factory-

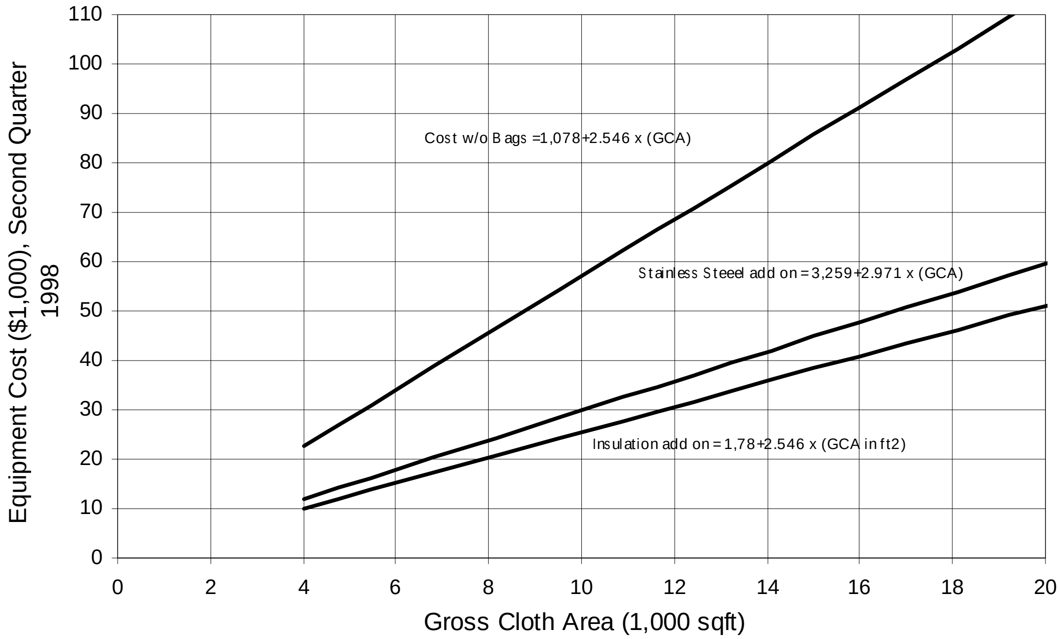


Figure 1.6: Equipment Costs for Shaker Filters (Intermittent)

Note: This graph should not be extrapolated.

Note: GCA = Gross Cloth Area in sqft

Source: ETS Inc.

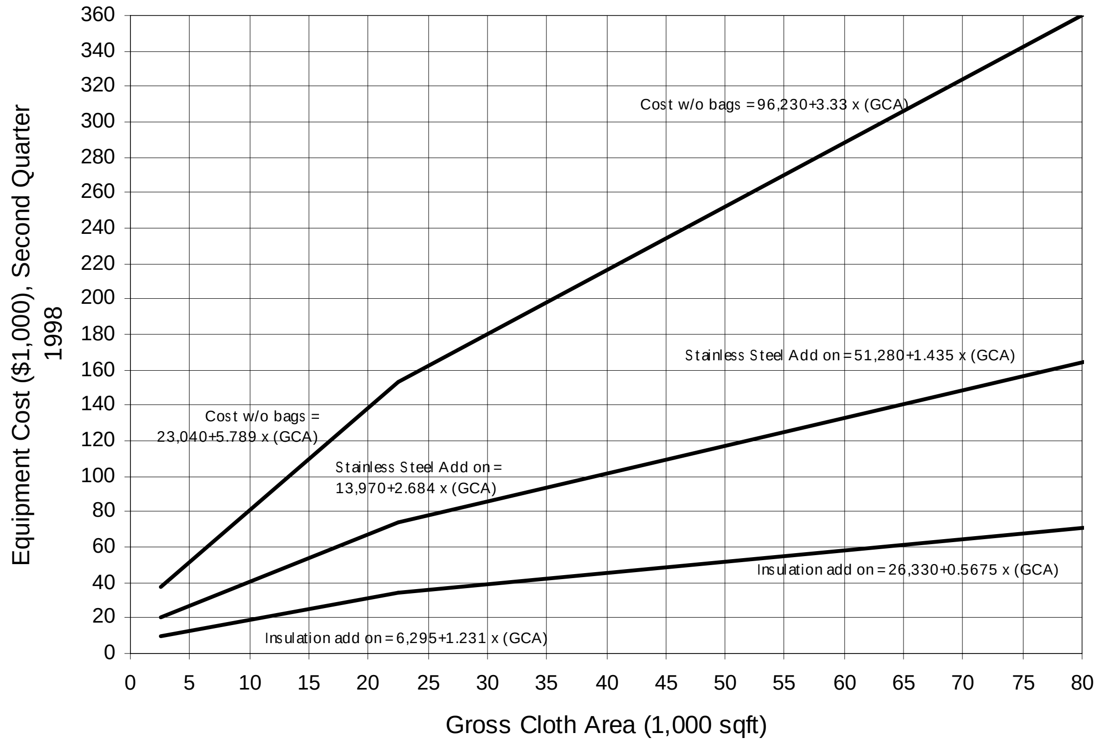


Figure 1.7: Equipment Costs for Shaker Filters (Continuous)

Note: this graph should not be extrapolated

Note: GCA = Gross Cloth Area in sqft

Source: ETS Inc.

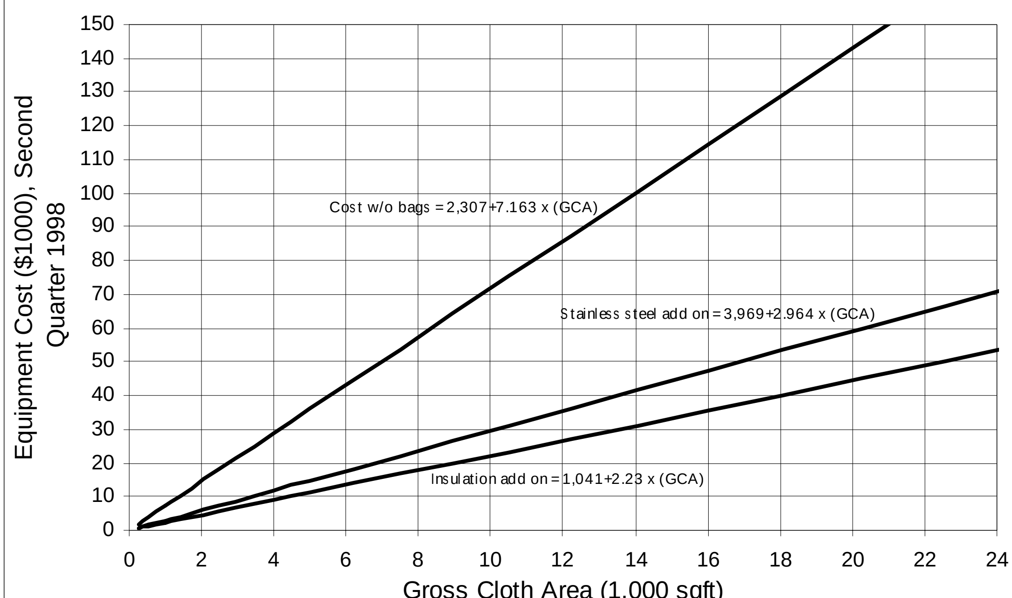


Figure 1.8: Equipment Costs for Pulse-Jet Filters (Common Housing)

Note: this graph should not be extrapolated

Note: GCA= Gross Cloth Area in sqft

Source: ETS Inc.

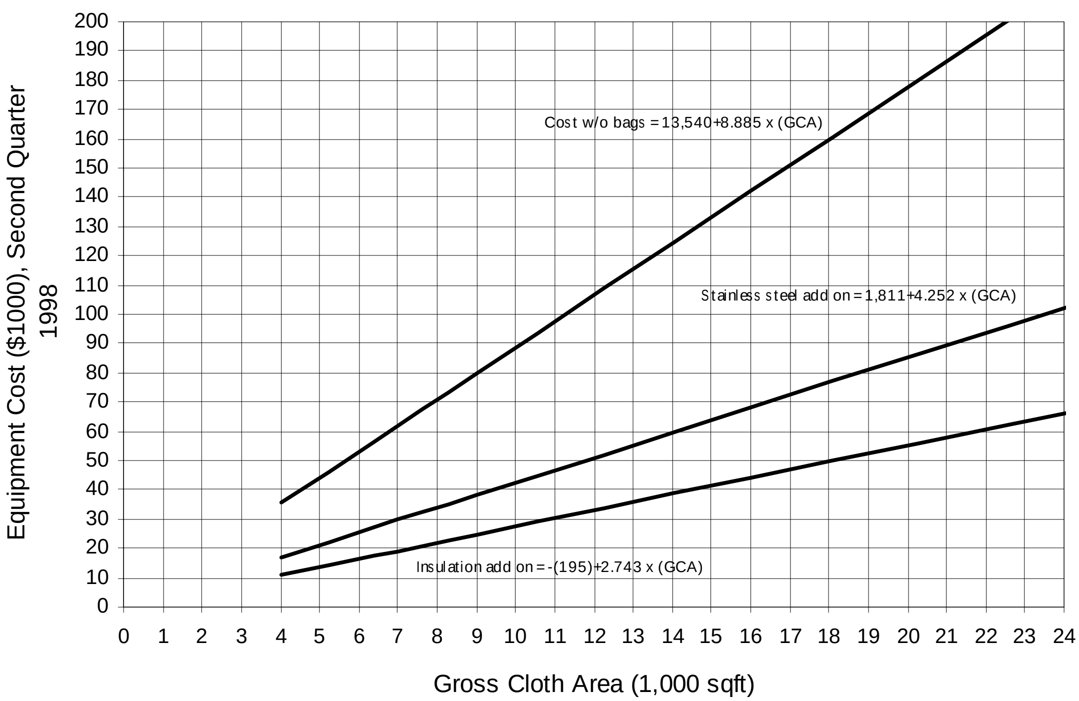


Figure 1.9: Equipment Costs for Pulse-Jet Filters (modular)

Note: this chart should not be extrapolated

Note: GCA= Gross Cloth Area in sqft

Source: ETS Inc.

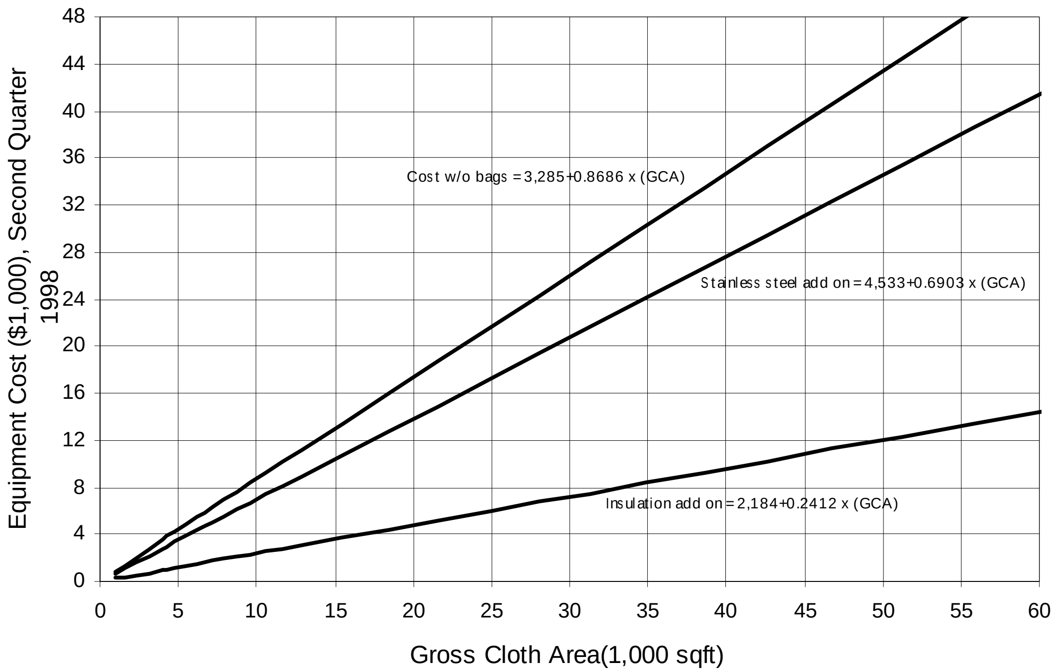


Figure 1.10: Equipment Costs for Cartirdge Filters

Note: this graph should not be extrapolated

Note: GCA= Gross Cloth Area in sqft

Source: ETS Inc.

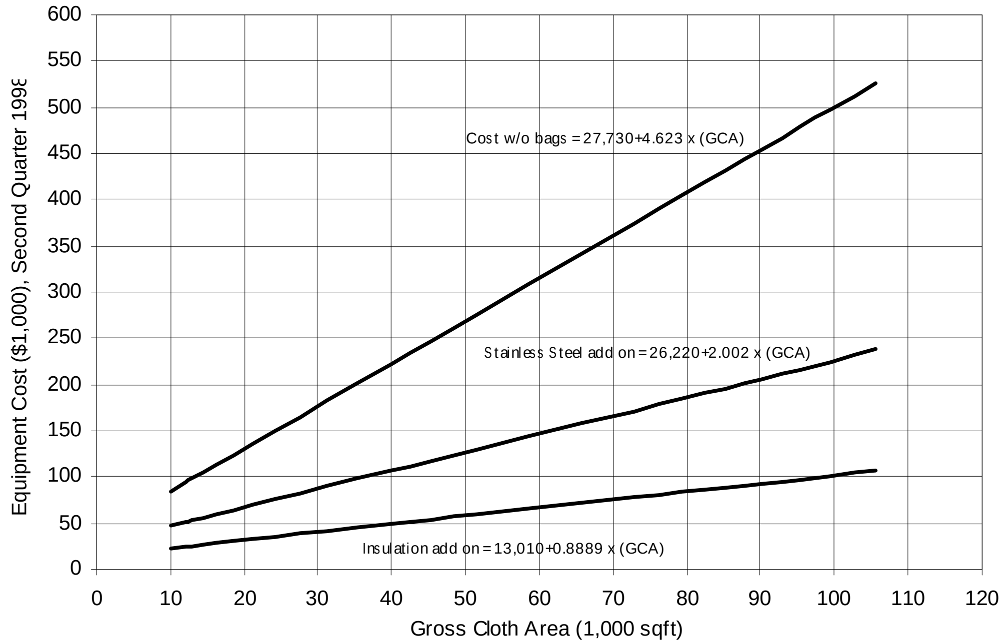


Figure 1.11: Equipment Costs for Reverse-Air Filters (Modular)
Note: this graph should not be extrapolated
Note GCA= Gross Cloth Area in sqft
Source: ETS Inc.

Figure 1.12: Equipment Costs for Reverse -Air filters (Custom Built)
Note: this graph should not be extrapolated
Note GCA= Gross Cloth Area in sqft
Source: ETS Inc.

assembled baghouses. Prices for custom-built shaker units are not shown, but are expected to be similar to custom-built reverse-air units.

1.4.1.2 Bag Costs

Table 1.8 gives the 1998 price per square foot of bags by type of fabric and by type of cleaning system used. Actual quoted prices may vary by ± 10 % from the values in the table. When estimating bag costs for an entire baghouse, gross cloth area as determined from Table 1.2 should be used. Membrane PTFE fabric costs are a combination of the base fabric cost and a premium for the PTFE laminate and its application. As fiber market conditions change, the costs of fabrics relative to each other also change. Prices are based on typical fabric weights in ounces/ square yard. Sewn-in snap rings are included in the price, but other mounting hardware, such as clamps or cages, must be added, based on the type of baghouse.

1.4.1.3 Auxiliary Equipment

Figure 1.1 shows auxiliary equipment, which is discussed elsewhere in the Manual. Because hoods, ductwork, precoolers, cyclones, fans, motors, dust removal equipment and stacks are common to many pollution control systems, they are (or will be) given extended treatment in separate chapters. For instance, Section 2 provides sizing and costing procedures and data for hoods, ductwork, and stacks.

1.4.2 Total Purchased Cost

The total purchased cost of the fabric filter system is the sum of the costs of the baghouse, bags, and auxiliary equipment; instruments and controls, taxes, and freight. Instruments and controls, taxes, and freight are generally taken as percentages of the estimated total cost of the first three items. Typical values, from Section 1, are 10% for instruments and controls, 3% for taxes, and 5% for freight.

Bag costs vary from less than 15% to more than 100% of the cost of the bare baghouse (baghouse without bags or auxiliaries), depending on the type of fabric required. This situation makes it inadvisable to estimate total purchased cost without separately estimating baghouse and bag costs, and discourages the use of a single factor to estimate a cost for the combined baghouse and bags.

Table 1.8: Bag Prices
(2^{nd} quarter 1998 \$/ft^2)

Type of Cleaning	Bag Diameter (inches)	Type of Material[a] PE	PP	NO	HA	FG	CO	TF	P8	RT	NX
Pulse jet, TR[b]	4-1/2 to 5-1/8	0.75	0.81	2.17	1.24	1.92	NA	12.21	4.06	2.87	20.66
	6 to 8	0.67	0.72	1.95	1.15	1.60	NA	9.70	3.85	2.62	NA
Pulse jet, BBR	4-1/2 to 5-1/8	0.53	0.53	1.84	0.95	1.69	NA	12.92	3.60	2.42	16.67
	6 to 8	0.50	0.60	1.77	0.98	1.55	NA	9.00	3.51	2.30	NA
Pulse jet, Cartridge[c]	4-7/8	2.95	NA	6.12	NA	NA	NA	NA	NA	NA	NA
	6-1/ 8	1.53	NA	4.67	NA	NA	NA	NA	NA	NA	NA
Shaker, Strap top	5	0.63	0.88	1.61	1.03	NA	0.70	NA	NA	NA	NA
Shaker, Loop top	5	0.61	1.01	1.53	1.04	NA	0.59	NA	NA	NA	NA
Reverse air with rings	8	0.63	1.52	1.35	NA	1.14	NA	NA	NA	NA	NA
	11-1/2	0.62	NA	1.43	NA	1.01	NA	NA	NA	NA	NA
Reverse air w/o rings	8	0.44	NA	1.39	NA	0.95	NA	NA	NA	NA	NA
	11-1/2	0.44	NA	1.17	NA	0.75	NA	NA	NA	NA	NA

NA = Not applicable.

[a]Materials:

PE = 16-oz polyester
PP = 16-oz polypropylene
NO = 14-oz Nomex
HA = 16-oz homopolymer acrylic
FG = 16-oz fiberglass with 10% Teflon
CO = 9-oz cotton
TF = 22-oz Teflon felt
P8 = 16-oz P84
RT = 16-oz Ryton
NX = 16-oz Nextel

[b]Bag removal methods:

TR = Top bag removal (snap in)
BBR = Bottom bag removal

[c]Costs for 12.75-in. diameter by 26-in. length cartridges are \$59.72 for a polyester/cellulose blend (\$0.26/ft^2 for 226 ft^2) and \$126.00 for spunbonded polyester (\$1.26/ft^2 for 100 ft^2).

NOTE: For pulse-jet baghouses, all bags are felts except for the fiberglass, which is woven. For bottom access pulse jets, the mild steel cage price for one 4 1/2-in. diameter cage or one 5 5/8-in. diameter cage can be calculated from the single-bag fabric area using the following two sets of equations, respectively.

Table 1.8: (Cont.)

<u>4-1/2 in. x 8 ft cages</u>:	<u>5-5/8 in x 10 ft cages</u>:
\$ = 7.8444 exp(0.0355 ft^2) in 25 cage lots	*\$ = 5.6542 $ft^{2\ (0.4018)}$ in 25 cage lots*
\$ = 6.0211 exp(0.0423 ft2) in 50 cage lots	*\$ = 4.3080 $ft^{2\ (0.4552)}$ in 50 cage lots*
\$ = 4.2635 exp(0.0522 ft^2) in 100 cage lots	*\$ = 3.0807 $ft^{2\ (0.5249)}$ in 100 cage lots*
\$ = 3.4217 exp(0.0593 ft^2) in 500 cage lots	*\$ = 2.5212 $ft^{2\ (0.5686)}$ in 500 cage lots*

These costs apply to 8-foot and 10-foot cages made of 11 gauge mild steel and having 10 vertical wires and "Roll Band" tops. For snap-band collar with built-in venturi, add \$6.00 per cage for mild steel and \$13.00 per cage for stainless steel. For stainless steel cages use:

\$ = 8.8486 + 1.5734 ft^2 in 25 cage lots	*\$ = 21.851 + 1.2284 ft^2 in 25 cage lots*
\$ = 6.8486 + 1.5734 ft^2 in 50 cage lots	*\$ = 8.8486 + 1.2284 ft^2 in 50 cage lots*
\$ = 4.8466 + 1.5734 ft^2 in 100 cage lots	*\$ = 8.8486 + 1.2284 ft^2 in 100 cage lots*
\$ = 3.8486 + 1.5734 ft^2 in 500 cage lots	*\$ = 8.8486 + 1.2284 ft^2 in 500 cage lots*

For shakers and reverse air baghouses, all bags are woven. All prices are for finished bags, and prices can vary from one supplier to another. For membrane bag prices, multiply base fabric price by factors of 3 to 4.5.

Sources: ETS Inc.[24]

1.4.3 Total Capital Investment

The total capital investment (TCI) is the sum of three costs, purchased equipment cost, direct installation costs, and indirect installation costs. The factors needed to estimate the TCI are given in Table 1.9. The Table 1.9 factors may be too large for "packaged" fabric filters—those pre-assembled baghouses that consist of the compartments, bags, waste gas fan and motor, and instruments and controls. Because these packaged units require very little installation, their installation costs would be lower (20–25% of the purchased equipment cost). Because bag costs affect total purchased equipment cost, the cost factors in Table 1.9 may cause overestimation of total capital investment when expensive bags are used. Using stainless steel components can also cause overestimation. Because baghouses range in size, specific factors for site preparation or for buildings are not given. Costs for buildings may be obtained from such references as Means Construction Cost Data 1998.[25] Land, working capital, and off-site facilities are not normally required and have been excluded from the table. When necessary, these costs can be estimated.

1.5 Estimating Total Annual Costs

1.5.1 Direct Annual Cost

Direct annual costs include operating and supervisory labor, operating materials, replacement bags, maintenance (labor and materials), utilities, and dust disposal. Most of these costs are discussed individually below. They vary with location and time, and, for this reason, should be obtained to suit the specific baghouse system being costed. For example, current labor rates may be found in such publications as the Monthly Labor Review, published by the U.S. Department of Labor, Bureau of Labor Statistics (BLS), or obtained from the BLS web site at: *http://stats.bls.gov.*

1.5.1.1 Operating and Supervisory Labor

Typical operating labor requirements are 2 to 4 hours per shift for a wide range of filter sizes.[26] When fabric filters are operated to meet Maximum Achievable Control Technology (MACT) regulations, it is likely that the upper end of the range is appropriate. Small or well-performing units may require less time, while very large or troublesome units may require more. Supervisory labor is taken as 15% of operating labor.

1.5.1.2 Operating Materials

Operating materials are generally not required for baghouses. An exception is the use of precoat materials injected on the inlet side of the baghouse to provide a protective dust layer on the bags when sticky or corrosive particles might harm them. Adsorbents may be similarly injected when the baghouse is used for simultaneous particle and gas removal. Costs for these materials should be included on a dollars-per-mass basis (e.g., dollars per ton).

1.5.1.3 Maintenance

Maintenance labor varies from 1 to 2 hours per shift.[26] As with operating labor, these values may be reduced or exceeded depending on the size and operating difficulty of a particular unit. The upper end of the range may be required for operation to meet MACT regulations. Maintenance materials costs are assumed to be equal to maintenance labor costs.[26]

Table 1.9 Capital Cost Factors for Fabric Filters[a]

Cost Item	Factor
<u>Direct costs</u>	
Purchased equipment costs	
Fabric filter (EC) + bags + auxiliary equipment	As estimated, A
Instrumentation	0.10 A
Sales taxes	0.03 A
Freight	0.05 A
Purchased Equipment Cost, PEC	B = 1.18 A
Direct installation costs	
Foundations & supports	0.04 B
Handling & erection	0.50 B
Electrical	0.08 B
Piping	0.01 B
Insulation for ductwork[b]	0.07 B
Painting[c]	0.04 B
Direct installation cost	0.74 B
Site preparation	As required, SP
Buildings	As required, Bldg.
Total Direct Cost	**1.74 B + SP + Bldg.**
<u>Indirect Costs (installation)</u>	
Engineering	0.10 B
Construction and field expense	0.20 B
Contractor fees	0.10 B
Start-up	0.01 B
Performance test	0.01 B
Contingencies	0.03 B
Total Indirect Cost, IC	**0.45 B**
Total Capital Investment = DC + IC	**2.19 B + SP + Bldg.**

[a]Reference [29], revised
[b]Ductwork and stack costs, including insulation costs, may be obtained from Chapter 10 of the manual. This installation factor pertains solely to insulation for fan housings and other auxiliaries, except for ductwork and stacks.
[c]The increased use of special coatings may increase this factor to 0.06B or higher. [The factors given in Table 1.8 are for average installation conditions. Considerable variation may be seen with other-than-average installation circumstances.]

1.5.1.4 Replacement Parts

Replacement parts consist of filter bags, which have a typical operating life of about 2 to 4 years. The following formula is used for computing the bag replacement cost:

$$CRC_B = \left(C_B + C_L\right) \times CRF_B \tag{1.13}$$

where

CRC_B	=	bag capital recovery cost ($/year)
C_B	=	initial bag cost including taxes and freight ($)
C_L	=	bag replacement labor ($)
CRF_B	=	capital recovery factor (defined in Chapter 2) whose value is a function of the annual interest rate and the useful life of the bags (For instance, for a 7% interest rate and a 2-year life, CRF_B = 0.5531.)

Bag replacement labor cost (C_L) depends on the number, size, and type of bags; their accessibility; how they are connected to the baghouse tube-sheet; and other site-specific factors that increase or decrease the quantity of labor required. For example, a reverse-air baghouse probably requires from 10 to 20 person-minutes to change an 8-inch by 24-foot bag that is clamped in place. Based on a filtering surface area of approximately 50 ft^2 and a labor rate of $29.15/h (including overhead), C_L would be $0.10 to $0.19/ft^2 of bag area. As Table 1.8 shows, for some bags (e.g., polyester), this range of C_L would constitute a significant fraction of the purchased cost. For pulse jets, replacement time would be about 5 to 10 person-minutes for a 5-inch by 10-foot bag in a top-access baghouse, or $0.19 to $0.37/ft^2 of bag area. This greater cost is partially offset by having less cloth in the baghouse, but there may be more of the smaller bags. These bag replacement times are based on changing a minimum of an entire module and on having typical baghouse designs. Times would be significantly longer if only a few bags were being replaced or if the design for bag attachment or access were atypical. Cartridge baghouses with horizontal mounting take about 4 minutes to change one cartridge. Older style baghouses with vertical mounting and blow pipes across the cartridges take about 20 min/cartridge.

The Manual methodology treats bags and bag replacement labor as an investment amortized over the useful life of the bags, while the rest of the control system is amortized over its useful life, typically 20 years (see Subsection 1.5.2). Capital recovery factor values for bags with different useful lives can be calculated based on the method presented in Section 1.

1.5.1.5 Electricity

Electricity is required to operate system fans and cleaning equipment. Primary gas fan power can be calculated as described in Chapter 2 of Section 2 and assuming a combined fan-motor efficiency of 0.65 and a specific gravity of 1.000. We obtain:[27]

$$Power_{fan} = 0.000181\ Q(\Delta P)\theta \tag{1.14}$$

where

$Power_{fan}$	=	fan power requirement (kWh/yr)
Q	=	system flow rate (acfm)
ΔP	=	system pressure drop (in. H_2O)
θ	=	operating time (h/yr)

Cleaning energy for reverse-air systems can be calculated (using equation 1.14) from the number of compartments to be cleaned at one time (usually one, sometimes two), and the reverse gas-to-cloth ratio (from about one to two times the forward gas-to-cloth ratio). Reverse-air pressure drop varies up to 6 or 7 in. H_2O depending on location of the fan pickup (before or after the main system fan).[28] The reverse-air fan generally runs continuously.

Typical energy consumption in kWh/yr for a shaker system operated 8,760 h/yr can be calculated from:[5]

$$P = 0.053\ A \tag{1.15}$$

where

A	=	gross fabric area (ft^2)

1.5.1.6 Fuel

Fuel costs must be calculated if the baghouse or associated ductwork is heated to prevent condensation. These costs can be significant, but may be difficult to predict. For methods of calculating heat transfer requirements, see Perry.[29]

1.5.1.7 Water

Cooling process gases to acceptable temperatures for fabrics being used can be done by dilution with air, evaporation with water, or heat exchange with normal equipment. Evaporation and normal heat exchange equipment require consumption of plant water, although costs are not usually significant. Chapter 1 of Section 3.1, Adsorbers, provides information on estimating cooling-water costs.

1.5.1.8 Compressed Air

Pulse-jet filters use compressed air at pressures from about 60 to 100 psig. Typical consumption is about 2 scfm/1,000 cfm of gas filtered.[5] For example, a unit filtering 20,000 cfm of gas uses about 40 scfm of compressed air for each minute the filter is operated. For each pulse, cartridge filters with nonwoven fabrics use 10 scfm/1,000 ft^2 or 14 scfm/1,000 ft^2 at 60 psig or 90 psig pulse pressure, respectively, in one manufacturer's design.[30] When using paper media, the air quantities are 1.7 scfm/1,000 ft^2 and 2.2 scfm/1,000 ft^2 at the respective pressures. Pulse frequency ranges from about 5 min. to 15 min. A typical cost for compressed air is $0.25/1,000 scf in 1998 dollars.

1.5.1.9 Dust Disposal

If collected dust cannot be recycled or sold, it must be landfilled or disposed of in some other manner. Disposal costs are site-specific, but typically run $35 to $55 per ton at municipal waste sites in Pennsylvania, exclusive of transportation (see Section 1). Lower costs may be available for industrial operations with long-term disposal contracts. Hazardous waste disposal can cost $150 per ton or more.

1.5.2 Indirect Annual Cost

Indirect annual costs include capital recovery, property taxes, insurance, administrative costs ("G&A"), and overhead. The capital recovery cost is based on the equipment lifetime and the annual interest rate employed. (See Section 1 for a discussion of the capital recovery cost and the variables that determine it.) For fabric filters, the system lifetime varies from 5 to 40 years, with 20 years being typical.[26] However, this does not apply to the bags, which usually have much shorter lives. Therefore, one should base system capital recovery cost estimates on the installed capital cost, less the cost of replacing the bags (*i.e.*, the purchased cost of the bags plus the cost of labor necessary to replace them). Algebraically:

$$CRC_s = \left[TCI - C_B - C_L\right]CRF_s \tag{1.16}$$

where

CRC_s	=	capital recovery cost for fabric filter system ($/yr)
TCI	=	total capital investment ($)
C_B	=	initial cost of bags *including* taxes and freight ($)[4]
C_L	=	labor cost for replacing bags ($)
CRF_s	=	capital recovery factor for fabric filter system (defined in Chapter 2).

For example, for a 20-year system life and a 7% annual interest rate, the CRF_s would be 0.09439.

The suggested factor to use for property taxes, insurance, and administrative charges is 4% of the *TCI* (see Section 1). Finally, overhead is calculated as 60% of the total labor (operating, supervisory, and maintenance) and maintenance materials.

1.5.3 Recovery Credits

For processes that can reuse the dust collected in the baghouse or that can sell the dust (e.g., fly ash sold as an extender for paving mixes), a recovery credit (*RC*) should be taken. As used in equation 1.17, this credit (*RC*) is subtracted from the *TAC*.

1.5.4 Total Annual Cost

Total annual cost for owning and operating a fabric filter system is the sum of the components listed in Sections 1.5.1 through 1.5.3:

$$TAC = DC + IC - RC \tag{1.17}$$

where

TAC	=	total annual cost ($)
DC	=	direct annual cost ($)
IC	=	indirect annual cost ($)
RC	=	recovery credits (annual) ($)

1.6 Example Problem

Assume a baghouse is required for controlling fly ash emissions from a coal-fired boiler. The flue gas stream is 50,000 acfm at 325°F and has an ash loading of 4 gr/acf. Analysis of the ash shows a mass median diameter of 7 μm. Assume the baghouse operates for 8,640 h/yr (360 d).

[4]Typically, 8% of the bag initial cost.

The gas-to-cloth ratio (*G/C*) can be taken from Table 1.1 as 2.5, for woven fabrics in shaker or reverse-air baghouses, or 5, for felts used in pulse-jet baghouses. If a factor method were used for estimating *G/C*, Table 1.3 for shakers would yield the following values: $A = 2$, $B = 0.9$, and $C = 1.0$. The gas-to-cloth ratio would be:

$$2 \times 0.9 \times 1.0 = 1.8.$$

This value could also be used for reverse-air cleaning. For a pulse-jet unit, Table 1.4 gives a value of 9.0 for factor *A* and 0.8 for factor *B*. Equation 1.11 becomes:

$$\begin{aligned} V &= 2.878 \times 9.0 \times 0.8(275)^{-0.2335}(4)^{-0.06021}\left(0.7471 + 0.0853 \ln 7\right) \\ &= 4.69 \end{aligned}$$

Because this value is so much greater than the shaker/reverse-air *G/C*, we conclude that the pulse-jet baghouse would be the least costly design. This conclusion is based on the inference that a much bigger *G/C* would yield lower capital and, in turn, annual costs. However, to make a more rigorous selection, we would need to calculate and compare the total annual costs of all three baghouse designs (assuming all three are technically acceptable). The reader is invited to make this comparison. Further discussion of the effects of *G/C* increases, and accompanying pressure drop increases, on overall annual costs will be found in Reference 30.[5] Assume the use of on-line cleaning in a common housing structure and, due to the high operating temperature, the use of glass filter bags (see Table 1.6).[6] At a gas-to-cloth ratio of 4.69, the fabric required is[7]

$$50{,}000 \text{ acfm}/4.69 \text{ fpm} = 10{,}661 \text{ ft}^2.$$

From Figure 1.8, the cost of the baghouse ("common housing" design) is:

$$Cost = 2{,}307 + 7.163(10{,}661) = \$78{,}672$$

---

[5]In addition, the CO$T-AIR control cost spreadsheet for fabric filters computes capital and annual costs for all three designs. Download CO$T-AIR at: *http://www.epa.gov/ttn/catc/products.html#ccc.info.*

[6]As Table 1.6 shows, other bag materials (e.g., Nomex) also could withstand this operating temperature. But Fiberglas is the least expensive on a purchased cost basis. For harsh environments, a more expensive, but more durable bag might cost less on a total annual cost basis.

[7]This is the total (gross) bag area required. No bag adjustment factor has been applied here, because this is a common housing pulse jet unit that is cleaned continuously during operation. Thus, no extra bag compartment is needed, and the gross and net bag areas are equal.

Insulation is required. The insulation add-on cost from Figure 1.8 is:

$$Cost = 1{,}041 + 2.23(10{,}661) = \$24{,}815$$

From Table 1.8, bag costs are $1.69/ft^2 for 5-1/8-inch diameter glass fiber, bottom removal bags. Total bag cost is

10,661 ft^2 x $1.69/ft^2 = $18,017.

For 10 ft long cages,

$$fabric\ area\ per\ cage = \frac{\left(5\tfrac{1}{8}\ in\right)}{\left(12\ \tfrac{in}{ft}\right)} \times \pi \times 10\ ft = 13.42\ ft^2$$

$$the\ number\ of\ cages = \frac{\left(10{,}661\ ft^2\right)}{\left(13.42\ ft^2\right)}$$

$$= 795\ \ cages\ \ (rounded\ up\ to\ the\ next\ integer)$$

From Table 1.7, individual cage cost is

2.5212 x 13.42 ft$^{2(0.5686)}$ = $11.037.

Total cage cost is

795 cages x $11.037/cage = $8,774.

Assume the following auxiliary costs have been estimated from data in other parts of the Manual:

Ductwork	$19,000
Fan	19,000
Motor	12,000
Starter	4,700
Dampers	9,800
Compressor	8,000
Screw conveyor	5,000
Stack	12,000
Total	**$89,500**

Direct costs for the fabric filter system, based on the factors in Table 1.9, are given in Table 1.10. (Again, we assume site preparation and buildings costs to be negligible.) Total capital investment is $569,000. Table 1.11 gives the direct and indirect annual costs, as calculated from the factors given in Section 1.5.1. For bag replacement labor, assume 10 min per bag for each of the 795 bags. At a maintenance labor rate of $29.65 (including overhead), the labor cost is $3,943 for 133 h. The bags and cages are assumed to be replaced every 2 yr. The replacement cost is calculated using Equation 1.13.

Pressure drop (for energy costs) can be calculated from Equations 1.8 and 1.9, with the following assumed values:

$$K_2 = 15 \frac{\dfrac{in\ \mathrm{H_2O}}{1\left(ft/min\right)}}{\dfrac{lb}{ft^2}}$$

$$P_j = 100\ \ psig$$

$$cleaning\ interval = 10\ min$$

We further assume that a *G/C* of 4.69 ft/min is a good estimate of the mean face velocity over the duration of the filtering cycle.

$$W_o = C_i V\theta$$

$$= 4\frac{gr}{ft^3} \times \frac{1lb}{7{,}000gr} \times 4.69\frac{ft}{min} \times 10min$$

$$= 0.0268\frac{lb}{ft^2}$$

$$\Delta P = 6.08 \times 4.69\frac{ft}{min} \times (100 \quad psig)^{-0.65}$$

$$+ 15\frac{\frac{in\,\mathrm{H_2O}}{ft/min}}{lb/ft^2} \times 0.0268\frac{lb}{ft^2} \times 4.69\frac{ft}{min}$$

$$= 3.32 \;\; in \;\; \mathrm{H_2O} \text{ across the fabric (when fully loaded).}$$

Assume that the baghouse structure and the ductwork contribute an additional 3 in. H_2O and 4 in. H_2O, respectively. The total pressure drop is, therefore, 10.3 inches.

The total annual cost is \$474,000, 39 percent of which is for ash disposal. If a market for the fly ash could be found, the total annual cost would be greatly reduced. For example, if \$2/ton were received for the ash, the total annual cost would drop to \$274,000 (\$474,000 – \$185,000 – \$14,800), or 58% of the cost when no market exists. Clearly, the total annual cost is extremely sensitive to the value chosen for the dust disposal cost in this case. In this and in similar cases, this value should be selected with care.

Table 1.10 Capital Costs for Fabric Filter System
Example Problem (2nd quarter 1998 $)

Cost Item	Cost
Direct Costs	
Purchased equipment costs	
Fabric filter (with insulation)(EC)	$103,847
Bags and cages	26,791
Auxiliary equipment	89,500
Sum = A	$220,138
Instrumentation, 0.1A	22,014
Sales taxes, 0.03A	6,604
Freight, 0.05A	11,007
Purchased equipment cost, B	$259,763
Direct installation costs	
Foundation and supports, 0.04B	10,391
Handling and erection, 0.50B	129,882
Electrical, 0.08B	20,781
Piping, 0.01B	2,598
Insulation for ductwork, 0.07B	18,183
Painting, 0.04B	10,391
Direct installation cost	192,226
Site preparation	-
Facilities and buildings	-
Total Direct Cost	**$451,989**
Indirect Costs (installation)	
Engineering, 0.10B	25,976
Construction and field expenses, 0.20B	51,953
Contractor fees, 0.10B	25,976
Start-up, 0.01B	2,598
Performance test, 0.01B	2,598
Contingencies, 0.03B	7,793
Total Indirect Cost	**$116,894**
Total Capital Investment (rounded)	**$569,000**

Table 1.11 Annual Costs for Fabric Filter System
Example Problem (2nd quarter 1998 $)

Cost Item	Calculations	Cost
<u>Direct Annual Costs, DC</u>		
Operating labor		
Operator	$\frac{2\ h}{shift} \times \frac{3\ shifts}{day} \times \frac{360\ days}{yr} \times \frac{\$17.26}{h}$	$37,282
Supervisor	15% of operator = 0.15 x 37,282	5,592
Operating materials		—
Maintenance		
Labor	$\frac{1\ h}{shift} \times \frac{3\ shifts}{day} \times \frac{360\ days}{yr} \times \frac{\$17.74}{h}$	19,159
Material	100% of maintenance labor	19,159
Replacement parts, bags	[3,943 + (26,791 x 1.08[a])] x 0.5531	18,184
Utilities		
Electricity	$0.000181 \times 50{,}000\ acfm \times 10.3\ in\ H_2O \times \frac{8{,}640\ h}{yr} \times \frac{\$0.0671}{kWh}$	54,041
Compressed air (dried and filtered)	$\frac{2\ scfm}{1{,}000\ acfm} \times 50{,}000\ acfm \times \frac{\$0.25}{1{,}000\ scf} \times \frac{60\ min}{h} \times \frac{\$8{,}640\ h}{yr}$	12,960
Waste disposal	at $25/ton on-site for essentially 100% collection $\frac{4\ gr}{ft^3} \times \frac{1\ lb}{7{,}000\ gr} \times 50{,}000\ ft^3 \times \frac{60\ min}{h} \times \frac{8{,}640\ h}{yr} \times \frac{1\ ton}{2{,}000\ lb} \times \frac{\$25}{ton}$	185,134
Total DC	(rounded)	**351,500**
<u>Indirect Annual Costs, IC</u>		
Overhead	60% of sum of operating, supv., & maint. labor & maint. materials = 0.6(37,282+5,592+19,159+19,159)	48,715
Administrative charges	2% of Total Capital Investment = 0.02 ($568,883)	11,378
Property Tax	1% of Total Capital Investment = 0.01 ($568,883)	5,689
Insurance	1% of Total Capital Investment = 0.01 ($568,883)	5,689
Capital recovery[b]	0.09439 (568,883- 3,943 - 28,934 x 1.08)	50,594
Total IC (rounded)		**122,100**
Total Annual Cost	**(rounded)**	**$474,000**

[a]The 1.08 factor is for freight and sales taxes.
[b]The capital recovery cost factor, CRF, is a function of the fabric filter or equipment life and the opportunity cost of the capital (*i.e.*, interest rate). For example, for a 20-year equipment life and a 7% interest rate, CRF = 0.09439.

1.7 Acknowledgments

We gratefully acknowledge the following companies and individuals for contributing data to this section:

- Aget Manufacturing Company (Adrian, Michigan)
- Andrew S. Viner (formerly of RTI, North Carolina)
- BACT Engineering, Inc. (Arlington Heights, Illinois)
- The BHA Group (Kansas City, Missouri)
- Dustex Corporation (Charlotte, North Carolina)
- EV Air Systems, Inc. (Charlotte, North Carolina)
- Fuller Company (Bethlehem, Pennsylvania)
- W. L. Gore and Associates, Inc. (Elkton, Maryland)
- Griffin Environmental Company, Inc. (Syracuse, New York)
- Hosokawa Mikropul (Summit, New Jersey)
- Richard E. Jenkins (formerly of EPA)
- W. W. Sly Manufacturing Company (Cleveland, Ohio)
- Zurn Industries, Inc. (Birmingham, Alabama)

References

[1] Van Osdell, D. W., M. B. Ranade, G. P. Greiner, and D. F. Furlong, *Electrostatic Augmentation of Fabric Filtration: Pulse-jet Pilot Unit Experience*, November 1982 (EPA-600/7-82-062).

[2] Viner, A. S., G. P. Greiner, D. F. Furlong, and R. G. Hurst, *Pilot-Scale Evaluation of Top-Inlet and Advanced Electrostatic Filtration*, October 1986 (EPA-600/7-86-042).

[3] Donovan, R. P., *Fabric Filtration For Combustion Sources*, Marcel Dekker, Inc., New York, 1985.

[4] Turner, J. H., “Bag Filtration,” in *Handbook of Multiphase Systems*, ed. by G. Hetsroni, Hemisphere, New York, 1982.

[5] Turner, J. H., and J. D. McKenna, “Control of Particles by Filters,” in *Handbook of Air Pollution Technology*, ed. by S. Calvert and E. Englund, John Wiley & Sons, New York, 1984.

[6] Palazzo, L., J. Woolston, and P. Ristevski, *Retrofitting Shaker Baghouses to Cartridge Pulse Jet Technology* in *The User and Fabric Filtration Equipment - VII*, Proceedings, Toronto, September 12 - 14, 1994, Air and Waste Management Association, Pittsburgh.

[7] Klimczak, William, personal communication and information from Dustex publication P6100, *Principles of Pulse Jet Filter Performance.*

[8] Broadway, R. M. and R. W. Cass, *Fractional Efficiency of a Utility Boiler Baghouse: Nucla Generating Plant*, August 1975 (EPA-600/2-75-013-a [NITS PB 246 641]).

[9] Cass, R. W. and R. M. Bradway, *Fractional Efficiency of a Utility Boiler Baghouse: Sunbury Steam Electric Station*, March 1976 (EPA-600/2-76-077a [NTIS PB253 943]).

[10] Penny, C. W., *Electrostatic Effects in Fabric Filtration: Volume 1. Fields, Fabrics, and Particles (Annotated Data)*, September 1978 (EPA-600/7-78-142A [NTIS PB 288576]).

[11] Frederick, E. R., *Electrostatic Effects in Fabric Filtration: Volume 11. Triboelectric Measurements and Bag Performance*, July 1978 (EPA600/7-78.lA2B [NTIS PB 287207]).

[12] Frederick, E. R., *Electrical Effects in Particulate Matter Processes*, Filter Media Specification, Pittsburgh, 1987.

[13] Dennis, R., *et al.*., *Filtration Model for Coal Fly Ash with Glass Fabrics*, August 1977 (EPA-600/7-77-084 [NITS PB 276489]).

[14] Dennis, R., and H. A. Klemm, “Modeling Concepts for Pulse Jet Filtration.” *JAPCA*, 30(l), January 1980.

[15] Leith, D. and M. J. Ellenbecker, “Theory for Pressure Drop in a Pulse-Jet Cleaned Fabric Filter.” *Atm. Environment*, 14, 1980, pp. 845-852.

[16] Koehler, J. L. and D. Leith, “Model Calibration for Pressure Drop in a Pulse-Jet Cleaned Fabric Filter,” *Atm. Environment*, 17(10), 1983, pp. 1909-1913.

[17] Viner, A. S., and B. R. Locke, *Cost and Performance Models for Electrostatically Stimulated Fabric Filters*, April 1984 (EPA 600/8-84-016).

[18] Northrop Services, Inc. *Fabric Filter Workshop Reference Materials, 1977 Workshop*, Air Pollution Training Institute.

[19] Vatavuk, W. M., and R. B. Neveril, "Estimating Costs of Air-Pollution Control Systems, Part XI: Estimate the Size and Cost of Baghouses," *Chemical Engineering*, March 22, 1982, pp. 153-158.

[20] Frey, R. F., and T. V. Reinauer, "New Filter Rate Guide," *Air Engineering*, 30 April 1964.

[21] Owen, M. K. and A. S. Viner, *Microcomputer Programs for Particulate Control*, June 1985 (EPA-600/8-85-025a).

[22] Dennis, R. and H. A. Klemm, Fabric Filter Model Change: Vol. I, Detailed Technical Report, February 1979 (EPA-600/7-79-043a) [NTIS PB 293551]).

[23] Viner, A. S., *et al.*, "Comparison of Baghouse Test Results with the GCA/EPA Design Model," *JAPCA*, 34(8), August 1984.

[24] ETS, Inc., Roanoke, VA.

[25] R. S. Means Company, Inc., *Means Construction Cost Data, 1998*, Kingston, MA.

[26] Vatavuk, W. M., and R. B. Neveril, "Estimating Costs of Air-Pollution Control Systems, Part II: Factors for Estimating Capital and Operating Costs," *Chemical Engineering*, November 3, 1980, pp. 157-162.

[27] Perry, Robert H., *et al*., *Perry's Chemical Engineers' Handbook* (Fourth Edition), McGraw-Hill, New York, 1963, p. 6-20.

[28] Personal communication from Gary Greiner, ETS, Inc., to Jim Turner, Research Triangle Institute, October 24, 1986.

[29] Perry, Robert H., *et al*., *Perry's Chemical Engineers' Handbook* (Sixth Edition), McGraw-Hill, New York, 1984.

[30] Hosokawa Mikropul Environmental System, *Cartridge Dust Collectors*, product bulletin, undated (about 1997).

TECHNICAL REPORT DATA

(Please read Instructions on reverse before completing)

1. REPORT NO. 452/B-02-001	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE The EPA Air Pollution Control Cost Manual		5. REPORT DATE January, 2002 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Daniel Charles Mussatti		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Environmental Protection Agency Office of Air Quality Planning and Standards Air Quality Standards and Strategies Division Innovative Strategies and Economics Group Research Triangle Park, NC 27711		10. PROGRAM ELEMENT NO. 11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS Director Office of Air Quality Planning and Standards Office of Air and Radiation U.S. Environmental Protection Agency Research Triangle Park, NC 27711		13. TYPE OF REPORT AND PERIOD COVERED Final 14. SPONSORING AGENCY CODE EPA/200/04

15. SUPPLEMENTARY NOTES

Updates and revises EPA 453/b-96-001, OAQPS Control Cost Manual, fifth edition (in English only)

16. ABSTRACT

In Spanish, this document provides a detailed methodology for the proper sizing and costing of numerous air pollution control devices for planning and permitting purposes. Includes costing for volatile organic compounds (VOCs); particulate matter (PM); oxides of nitrogen (NOx); SO2, SO3, and other acid gasses; and hazardous air pollutants (HAPs).

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Economics Cost Engineering cost Sizing Estimation Design	Air Pollution control Incinerators Absorbers Adsorbers Filters Condensers Electrostatic Precipitators Scrubbers	

18. DISTRIBUTION STATEMENT Release Unlimited	19. SECURITY CLASS *(Report)* Unclassified	21. NO. OF PAGES 1,400
	20. SECURITY CLASS *(Page)* Unclassified	22. PRICE

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We Protect Hoosiers and Our Environment.
100 N. Senate Avenue • Indianapolis, IN 46204
(800) 451-6027 • (317) 232-8603 • www.idem.IN.gov

Eric J. Holcomb
Governor

Bruno L. Pigott
Commissioner

To:	Interested Parties
Date:	July 28, 2021
From:	Jenny Acker, Chief Permits Branch Office of Air Quality
Source Name:	Ingredion Incorporated Indianapolis Plant
Permit Level:	Title V Significant Source Mod. (Minor PSD/EO) (120)
Permit Number:	097-43933-00042
Source Location:	1515 South Drover Street, Indianapolis, Indiana 46221
Type of Action Taken:	Modification at an existing source

Notice of Decision: Approval - Effective Immediately

Please be advised that on behalf of the Commissioner of the Department of Environmental Management, I have issued a decision regarding the matter referenced above.

The final decision is available on the IDEM website at: http://www.in.gov/apps/idem/caats/
To view the document, choose Search Option **by Permit Number**, then enter permit 43933. This search will also provide the application received date, **draft permit** public notice start and end date, and **final** permit issuance date.

The final decision is also available via IDEM's Virtual File Cabinet (VFC). Please go to: https://www.IN.gov/idem and enter VFC in the search box. You will then have the option to search for permit documents using a variety of criteria.

(continues on next page)

If you would like to request a paper copy of the permit document, please contact IDEM's Office of Records Management:

IDEM - Office of Records Management
Indiana Government Center North, Room 1207
100 North Senate Avenue
Indianapolis, IN 46204
Phone: (317) 232-8667
Fax: (317) 233-6647
Email: IDEMFILEROOM@idem.in.gov

Pursuant to IC 13-15-5-3, this permit is effective immediately, unless a petition for stay of effectiveness is filed and granted according to IC 13-15-6-3, and may be revoked or modified in accordance with the provisions of IC 13-15-7-1.

If you wish to challenge this decision, IC 4-21.5-3 and IC 13-15-6-1 require that you file a petition for administrative review. This petition may include a request for stay of effectiveness and must be submitted to the Office of Environmental Adjudication, 100 North Senate Avenue, Government Center North, Room N103, Indianapolis, IN 46204, **within eighteen (18) calendar days of the mailing of this notice**. The filing of a petition for administrative review is complete on the earliest of the following dates that apply to the filing:

(1) the date the document is delivered to the Office of Environmental Adjudication (OEA);
(2) the date of the postmark on the envelope containing the document, if the document is mailed to OEA by U.S. mail; or
(3) The date on which the document is deposited with a private carrier, as shown by receipt issued by the carrier, if the document is sent to the OEA by private carrier.

The petition must include facts demonstrating that you are either the applicant, a person aggrieved or adversely affected by the decision or otherwise entitled to review by law. Please identify the permit, decision, or other order for which you seek review by permit number, name of the applicant, location, date of this notice and all of the following:

(1) the name and address of the person making the request;
(2) the interest of the person making the request;
(3) identification of any persons represented by the person making the request;
(4) the reasons, with particularity, for the request;
(5) the issues, with particularity, proposed for considerations at any hearing; and
(6) identification of the terms and conditions which, in the judgment of the person making the request, would be appropriate in the case in question to satisfy the requirements of the law governing documents of the type issued by the Commissioner.

If you have technical questions regarding the enclosed documents, please contact the Office of Air Quality, Permits Branch at (317) 233-0178. Callers from within Indiana may call toll-free at 1-800-451-6027, ext. 3-0178.

Enclosures
Final-Permit 9/27/17

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We Protect Hoosiers and Our Environment.
100 N. Senate Avenue • Indianapolis, IN 46204
(800) 451-6027 • (317) 232-8603 • www.idem.IN.gov

Eric J. Holcomb
Governor

Bruno L. Pigott
Commissioner

July 28, 2021

Ms. Melissa Putman
Ingredion Incorporated
1515 South Drover St.
Indianapolis, IN 46221

Re: 097-43933-00042
Significant Source Modification

Dear Ms. Putman:

Ingredion Incorporated Indianapolis Plant was issued Part 70 Operating Permit Renewal No. T097-42340-00042 on October 6, 2020 for a stationary wet corn milling plant which produces feed, gluten meal, germ meal, corn starch, and heavy steepwater. located at 1515 South Drover Street, Indianapolis, Indiana 46221. An application to modify the source was received on March 30, 2021. Pursuant to the provisions of 326 IAC 2-7-10.5, a Significant Source Modification is hereby approved as described in the attached Technical Support Document.

Pursuant to 326 IAC 2-7-10.5, the following emission units approved for construction at the source:

(1) One (1) CWS North Product, identified as unit 63-5, with a maximum throughput of 2.5 tons/hr, using a baghouse* for particulate control, constructed prior to 1974 and approved for modification in 2021, and exhausting to stack 49.

(2) One (1) CWS South Mill, identified as unit 63-17, constructed in 1977, approved for modification in 2021, with a maximum throughput of 0.8 tons/hr, using a baghouse** (replaced baghouse in 2008) for particulate control, and exhausting to stack 53.

The following construction conditions are applicable to the proposed modification:

<u>General Construction Conditions</u>

1. The data and information supplied with the application shall be considered part of this source modification approval. Prior to <u>any</u> proposed change in construction which may affect the potential to emit (PTE) of the proposed project, the change must be approved by the Office of Air Quality (OAQ).

2. This approval to construct does not relieve the Permittee of the responsibility to comply with the provisions of the Indiana Environmental Management Law (IC 13-11 through 13-20; 13-22 through 13-25; and 13-30), the Air Pollution Control Law (IC 13-17) and the rules promulgated thereunder, as well as other applicable local, state, and federal requirements.

<u>Effective Date of the Permit</u>

3. Pursuant to IC 13-15-5-3, this approval becomes effective upon its issuance.

<u>Commenced Construction</u>

4. Pursuant to 326 IAC 2-1.1-9 and 326 IAC 2-7-10.5(j), the Commissioner may revoke this approval if construction is not commenced within eighteen (18) months after receipt of this approval or if construction is suspended for a continuous period of one (1) year or more.

5. All requirements and conditions of this construction approval shall remain in effect unless modified in a manner consistent with procedures established pursuant to 326 IAC 2.

Approval to Construct

6. Pursuant to 326 IAC 2-7-10.5(h)(2), this Significant Source Modification authorizes the construction of the new emission unit(s), when the Significant Source Modification has been issued.

Pursuant to 326 IAC 2-7-10.5(m), the emission units constructed under this approval shall not be placed into operation prior to revision of the source's Part 70 Operating Permit to incorporate the required operation conditions.

Pursuant to 326 IAC 2-7-12, operation of the new emission unit(s) is not approved until the Significant Permit Modification has been issued. Operating conditions shall be incorporated into the Part 70 Operating Permit as a Significant Permit Modification in accordance with 326 IAC 2-7-10.5(m)(2) and 326 IAC 2-7-12 (Permit Modification).

A copy of the permit is available on the Internet at: http://www.in.gov/ai/appfiles/idem-caats/. A copy of the application and permit is also available via IDEM's Virtual File Cabinet (VFC). To access VFC, please go to: https://www.in.gov/idem/ and enter VFC in the search box. You will then have the option to search for permit documents using a variety of criteria. For additional information about air permits and how the public and interested parties can participate, refer to the IDEM Air Permits page on the Internet at: https://www.in.gov/idem/airpermit/public-participation/; and the Citizens' Guide to IDEM on the Internet at: https://www.in.gov/idem/resources/citizens-guide-to-idem/.

This decision is subject to the Indiana Administrative Orders and Procedures Act - IC 4-21.5-3-5.

If you have any questions regarding this matter, please contact Taylor Wade, Indiana Department Environmental Management, Office of Air Quality, Permits Branch, 100 North Senate Avenue, MC 61-53 IGCN 1003, Indianapolis, Indiana 46204-2251, or by telephone at (317) 233-0868 or (800) 451-6027, and ask for Taylor Wade or (317) 233-0868.

Sincerely,

Madhurima Das for

Heath Hartley, Section Chief
Permits Branch
Office of Air Quality

Attachments: Minor Source Modification and Technical Support Document

cc: File - Marion County
Marion County Health Department
U.S. EPA, Region 5
Compliance and Enforcement Branch

IDEM

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

We Protect Hoosiers and Our Environment.

100 N. Senate Avenue • Indianapolis, IN 46204

(800) 451-6027 • (317) 232-8603 • www.idem.IN.gov

Eric J. Holcomb
Governor

Bruno L. Pigott
Commissioner

Significant Source Modification to a Part 70 Source

Ingredion Incorporated - Indianapolis Plant
1515 South Drover Street
Indianapolis, Indiana 46221

(herein known as the Permittee) is hereby authorized to construct subject to the conditions contained herein, the source described in Section A (Source Summary) of this permit.

This permit is issued in accordance with 326 IAC 2 and 40 CFR Part 70 Appendix A and contains the conditions and provisions specified in 326 IAC 2-7 as required by 42 U.S.C. 7401, et. seq. (Clean Air Act as amended by the 1990 Clean Air Act Amendments), 40 CFR Part 70.6, IC 13-15 and IC 13-17. This permit also addresses certain new source review requirements for new and/or existing equipment and is intended to fulfill the new source review procedures pursuant to 326 IAC 2-7-10.5, applicable to those conditions.

Significant Source Modification No.: 097-43933-00042 Master Agency Interest ID: 11515	
Issued by: Madhurima Das for Heath Hartley, Section Chief Permits Branch Office of Air Quality	Issuance Date: July 28, 2021

TABLE OF CONTENTS

SECTION A SOURCE SUMMARY

This permit is based on information requested by the Indiana Department of Environmental Management (IDEM), Office of Air Quality (OAQ). The information describing the source contained in conditions A.1 through A.3 is descriptive information and does not constitute enforceable conditions. However, the Permittee should be aware that a physical change or a change in the method of operation that may render this descriptive information obsolete or inaccurate may trigger requirements for the Permittee to obtain additional permits or seek modification of this permit pursuant to 326 IAC 2, or change other applicable requirements presented in the permit application.

A.1 General Information [326 IAC 2-7-4(c)][326 IAC 2-7-5(14)][326 IAC 2-7-1(22)]

The Permittee owns and operates a stationary wet corn milling plant which produces feed, gluten meal, germ meal, corn starch, and heavy steepwater.

Source Address:	1515 South Drover Street, Indianapolis, Indiana 46221
General Source Phone Number:	(317) 635-4455
SIC Code:	2046 (Wet Corn Milling)
County Location:	Marion
Source Location Status:	Attainment for all criteria pollutants
Source Status:	Part 70 Operating Permit Program Major Source, under PSD Rules Minor Source, Section 112 of the Clean Air Act Not 1 of 28 Source Categories

A.2 Emission Units and Pollution Control Equipment Summary [326 IAC 2-7-4(c)(3)][326 IAC 2-7-5(14)]

This stationary source consists of the following emission units and pollution control devices:

(a) One (1) natural gas-fired #1 Starch Flash Dryer, identified as unit 40-4, with a maximum heat input capacity of 30 Million British Thermal Units per hour (MMBtu/hr) and with a maximum air throughput of 42,200 dscfm, using a wet scrubber for particulate control, constructed in 1965 and modified in 1994, and exhausting to stack 40-4.

(b) One (1) natural gas-fired #2 Starch Flash Dryer, identified as unit 40-3, with a maximum heat input capacity of 36 MMBtu/hr and with a maximum air throughput of 73,000 dscfm, using a wet scrubber for particulate control, constructed in 1967 and modified in 1994 and 1999, and exhausting to stack 40-3.

(c) One (1) natural gas-fired #3 Starch Flash Dryer, identified as unit 40-2, with a maximum heat input capacity of 36 MMBtu/hr and with a maximum air throughput of 60,000 dscfm, using a wet scrubber for particulate control, constructed in 1971, and exhausting to stack 40-2.

(d) One (1) natural gas-fired #4 Starch Flash Dryer, identified as unit 575-1, with a maximum heat input capacity of 43 MMBtu/hr and with a maximum air throughput of 84,100 dscfm, using a wet scrubber for particulate control, constructed in 1977, and exhausting to stack 575-1.

(e) One (1) natural gas-fired #5 Starch Flash Dryer, identified as unit 575-2, with a maximum heat input capacity of 38 MMBtu/hr and with a maximum air throughput of 84,200 dscfm, using a wet scrubber for particulate control, constructed in 1979 and replaced in 1995, and exhausting to stack 575-2.

(f) One (1) natural gas-fired #6 Starch Flash Dryer, identified as unit 575-3, with a maximum heat input capacity of 40 MMBtu/hr and with a maximum throughput of 84,100 dscfm, using a wet scrubber for particulate control, constructed in 1993, and exhausting to stack 575-3.

(g) One (1) natural gas-fired #1 Spray Dryer, identified as unit 5549-1, with a maximum heat input capacity of 25 MMBtu/hr and with a maximum air throughput of 26,000 dscfm, using a wet scrubber for particulate control, constructed in 1993 and modified in 1998, and exhausting to stack 5549-1.

(h) One (1) natural gas-fired #2 Spray Dryer, identified as unit 5549-2, with a maximum heat input capacity of 25 MMBtu/hr and with a maximum air throughput of 26,000 dscfm, using a wet scrubber for particulate control, constructed in 1993 and modified in 1998, and exhausting to stack 5549-2.

(i) One (1) natural gas-fired Feed Dryer, identified as unit 5502-1A, with a maximum heat input capacity of 77 MMBtu/hr and with a maximum throughput of 20 tons/hr, using a first effect wash water system for SO_2 control, and the RTO, unit 5502-1D for VOC, HAPs, and particulate control, constructed in 1997, and exhausting to the inlet of unit 5502-1D.

(j) One (1) natural gas-fired Germ Dryer, identified as unit 5502-1B, with a maximum heat input capacity of 20 MMBtu/hr and with a maximum throughput of 11 tons/hr, using the RTO, unit 5502-1D, for VOC, HAPs, and particulate control, constructed in 1997, and exhausting to the inlet of unit 5502-1D.

(k) One (1) natural gas-fired Gluten Dryer, identified as unit 5502-1C, with a maximum heat input capacity of 32 MMBtu/hr and with a maximum throughput of 4.21 tons/hr, using the RTO, unit 5502-1D, for VOC, HAPs, and particulate control, constructed in 1997, and exhausting to the inlet of unit 5502-1D.

(l) One (1) natural gas-fired Regenerative Thermal Oxidizer (RTO), identified as unit 5502-1D, with a maximum heat input capacity of 18 MMBtu/hr, used as a control for VOC, HAPs, and particulate, with a maximum air throughput of 45,148 dscfm, constructed in 1997, and exhausting to stack 5502-7.

(m) Spray Agglomerator #3, identified as unit 5549-28, part of the spray agglomeration process, with a maximum heat input capacity of 25.0 MMBtu/hr and with a maximum air throughput of 38,000 dscfm, using a wet scrubber for particulate control, constructed in 2001, and exhausting to stack 5549-28.

(n) One (1) Product Storage Hopper, identified as unit 5552-1, with a maximum air throughput of 2,450 dscfm, using a baghouse* for particulate control, constructed in 1995, and exhausting to stack 5552-1.

(o) One (1) Product Transfer Hopper, identified as unit 5552-2, with a maximum air throughput of 350 dscfm, using a baghouse* for control, constructed in 1995, and exhausting to stack 5552-2.

(p) One (1) Germ Bin, one (1) Pellet Bin #1, and one (1) Pellet Bin #2, identified as units 5503-2, 5503-3, and 5503-4 respectively, and with a combined maximum throughput of 120 tons/hr, with a maximum air throughput of 8,640 dscfm, using a Loadout Dust Collection System for particulate control, identified as 5503-5, each constructed in 1997, and exhausting to stack 5503-2.

(q) One (1) DSW Packing Fugitive Dust Collector, identified as unit 71-7, with a maximum throughput of 0.1 tons/hr, with a maximum air throughput of 9,000 dscfm, using a baghouse for particulate control, constructed in 1977, and exhausting to stack 71-7.

(r) One (1) RSP North Packing Line, identified as unit 577-2, with a maximum throughput of 18 tons/hr, with a maximum air throughput of 9,600 dscfm, using a baghouse* for particulate control, constructed in 1979 and modified in 2000, and exhausting to stack 577-2.

(s) One (1) Gluten Receiver, identified as unit 5503-1, with a maximum throughput of 4.21 tons/hr, with a maximum air throughput of 18,580 dscfm, using a baghouse* for particulate control, constructed in 1997, and exhausting to stack 5503-1.

(t) One (1) Pellet Cooler and one (1) Germ Cooler, identified as units 5502-5 and 5502-6, with a maximum throughput of 19.36 tons/hr and 4.21 tons/hr respectively, with maximum air throughputs of 13,790 dscfm and 12,080 dscfm respectively, each using a high efficiency cyclone for particulate control, each constructed in 1997, and exhausting to stacks 5502-5 and 5502-6.

(u) Two (2) Loose Feed Bins, collectively identified as unit 5502-4, each with a maximum throughput of 19.36 tons/hr, using a baghouse for particulate control, constructed in 1997, and exhausting to stack 5502-3.

(v) One (1) Feed Dust Collector, identified as unit 5502-3, with a maximum throughput of 19.36 tons/hr, with a maximum air throughput of 11,700 dscfm, using a baghouse for particulate control, constructed in 1997, and exhausting to stack 5502-3.

(w) One (1) DSE Bag Slitter, identified as unit 42-10, with a maximum throughput of 10 tons/hr, with a maximum air throughput of 5,000 dscfm, using a baghouse for particulate control, constructed in 1987, and exhausting to stack 42-10.

(x) One (1) RSP Hopper #4, identified as unit 577-5, with a maximum air throughput of 4,500 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 577-5.

(y) One (1) RSP Hopper #6, identified as unit 577-6, with a maximum air throughput of 4,500 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 577-6.

(z) One (1) RSP Hopper #5, identified as unit 577-7, with a maximum air throughput of 4,500 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 577-7.

(aa) One (1) RSP Hopper #1, identified as unit 577-8, with a maximum air throughput of 4,500 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 577-8.

(bb) One (1) RSP Hopper #2, identified as unit 577-9, with a maximum air throughput of 4,500 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 577-9.

(cc) One (1) RSP Hopper #3, identified as unit 577-10, with a maximum air throughput of 4,500 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 577-10.

(dd) One (1) Industrial Packer, identified as unit 71-1, with a maximum air throughput of 5,300 dscfm, using a baghouse for particulate control, constructed in 1994, and exhausting to stack 71-1.

(ee) Two (2) Spray Dryer Product Receivers, identified as units 5549-3 and 5549-4, each with a maximum air throughput of 1,700 dscfm, each using a baghouse* for particulate control, constructed in 1993 and 1996, and exhausting to stacks 5549-3 and 5549-4.

(ff) One (1) Spray Dryer Storage Hopper #1, identified as unit 5549-7, with a maximum air throughput of 450 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 5549-7.

(gg) One (1) Spray Dryer Storage Hopper #2, identified as unit 5549-8, with a maximum air throughput of 450 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 5549-8.

(hh) One (1) #2 Spray Dryer Storage Hopper #3, identified as unit 5549-9, with a maximum air throughput of 450 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 5549-9.

(ii) One (1) #2 Spray Dryer Storage Hopper #4, identified as unit 5549-10, with a maximum air throughput of 450 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 5549-10.

(jj) One (1) Agglomerator Feed Storage Bin, identified as unit 5549-12, with a maximum air throughput of 1,530 dscfm, using a baghouse* for particulate control, constructed in 1995, and exhausting to stack 5549-12.

(kk) One (1) Agglomerator, identified as unit 5549-13, with a maximum air throughput of 12,500 dscfm, using a baghouse for particulate control, constructed in 1995, including one (1) natural gas-fired burner with a maximum heat input capacity of 1.824 MMBtu/hr, and exhausting to stack 5549-13.

(ll) One (1) Agglomerator Equipment Aspiration, identified as unit 5549-14, with a maximum air throughput of 2,840 dscfm, using a baghouse** for particulate control, constructed in 1995, and exhausting to stack 5549-14.

(mm) One (1) spray agglomeration process, constructed in 2000, consisting of the following units:

(1) Bulk Bag Packer Filter Receiver, identified as unit 5549-17, with a maximum air throughput of 450 dscfm, using a baghouse* for particulate control, and exhausting to stack 5549-17.

(2) Line 1 Middle Packer, identified as unit 5549-18, with a maximum air throughput of 4,600 dscfm, using a baghouse* for particulate control, and exhausting to stack 5549-18.

(3) Line 1 North Packer, identified as unit 5549-19, with a maximum air throughput of 5,400 dscfm, using a baghouse* for particulate control, and exhausting to stack 5549-19.

(4) #2 Fugitive Dust Collector, identified as emission unit 5549-20, with a maximum throughput of 14,000 dscfm, using a baghouse for particulate control, and exhausting to stack 5549-20.

(5) Line 1 Fugitive Dust Collector, identified as unit 5549-21, with a maximum air throughput of 14,000 dscfm, using a baghouse for particulate control, and exhausting to stack 5549-21.

(6) Line 2 Receiver, identified as unit 5549-26, with a maximum air throughput of

5,400 dscfm, using a baghouse* for particulate control, and exhausting to stack 5549-26.

(nn) One (1) Corn Truck Dump, identified as unit 56-1, with a maximum throughput of 448 tons/hr, with a maximum air throughput of 35,000 dscfm, using a baghouse for particulate control, constructed prior to 1968 and modified in 1996, and exhausting to stack 56-1.

(oo) Grinding and machining operations controlled with fabric filters with a design grain loading of less than or equal to 0.03 grains per actual cubic foot and a gas flow rate less than or equal to 4000 actual cubic feet per minute, including the following: deburring, buffing, polishing, abrasive blasting, pneumatic conveying, and woodworking operations:

(1) One (1) DSE Hopper #9, identified as unit 42-3A, with a maximum throughput of 10 tons/hr, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 6.

(2) One (1) DSE Hopper #10, identified as unit 42-3B, with a maximum throughput of 10 tons/hr, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 7.

(3) One (1) DSE Hopper #11, identified as unit 42-3C, with a maximum throughput of 10 tons/hr, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 43-3C.

(4) One (1) DSE Hopper #12, identified as unit 42-3D, with a maximum throughput of 10 tons/hr, with a maximum air throughput of 3,600 dscfm, using a baghouse* for particulate control, constructed prior to 1968, baghouse approved for replacement in 2020, and exhausting to stack 9.

(5) One (1) DSE Hopper #13, identified as unit 42-3E, with a maximum throughput of 10 tons/hr, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 10.

(6) One (1) DSE Hopper #14, identified as unit 42-3F, with a maximum throughput of 10 tons/hr, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack11.

(7) One (1) DSE Hopper #2, identified as unit 42-7A, with a maximum throughput of 10 tons/hr, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 14.

(8) One (1) DSE Hopper #4, identified as unit 42-7B, with a maximum throughput of 10 tons/hr, with a maximum air throughput of 2,600 dscfm, using a baghouse* for particulate control, constructed prior to 1968, baghouse approved for replacement in 2020,and exhausting to stack 14.

(9) One (1) DSE Hopper #6, identified as unit 42-7C, with a maximum throughput of 10 tons/hr, with a maximum air throughput of 2,600 dscfm, using a baghouse* for particulate control, constructed prior to 1968, baghouse approved for replacement in 2020,and exhausting to stack 16.

(10) One (1) DSE Hopper #1, identified as unit 42-8A, with a maximum throughput of 10 tons/hr, using a baghouse** for particulate control, constructed prior to 1968, and exhausting to stack 17A.

(11) One (1) DSE Hopper #3, identified as unit 42-8B, with a maximum throughput of

10 tons/hr, using a baghouse** for particulate control, constructed prior to 1968, and exhausting to stack 17B.

(12) One (1) DSE Hopper #5, identified as unit 42-8C, with a maximum throughput of 10 tons/hr, using a baghouse** for particulate control, constructed prior to 1968, and exhausting to stack 17C.

(13) One (1) DSE Hopper #7, identified as unit 42-8D, with a maximum throughput of 10 tons/hr, using a baghouse** for particulate control, constructed prior to 1968, and exhausting to stack 17D.

(14) One (1) CWS #8; identified as unit 63-1A, with a maximum throughput of 1 tons/hr, with a maximum air throughput of 2,400 dscfm, using a baghouse* for particulate control, constructed prior to 1968, and modified in 1976, baghouse approved for replacement in 2020,and exhausting to stack 46A.

(15) One (1) CWS South Mill, identified as unit 63-17, constructed in 1977, approved in 2021 for modification, with a maximum throughput of 0.8 tons/hr, using a baghouse** (replaced baghouse in 2008) for particulate control, and exhausting to stack 53.

(pp) One (1) Grain Elevator, identified as unit 56-2, with a maximum throughput of 80 tons/hr, using a baghouse** for particulate control, constructed prior to 1968, and exhausting to stack 24.

(qq) Starch operations, starch drying, starch handling and starch packaging consisting of the following units:

(1) One (1) Starch Mixer 1 Filter Receiver, identified as 152-1, with a maximum air throughput of 500 dscfm, using a baghouse* for particulate control, constructed in 2002, and exhausting to stack 152-1.

(2) One (1) Mixer 1 baghouse, identified as 152-2, with a maximum air throughput of 1,000 dscfm, using a baghouse* for particulate control, constructed in 2002 and modified in 2011, and exhausting to stack 152-2.

(3) One (1) Starch Mixer 2 Filter/Receiver, identified as 152-4, with a maximum air throughput of 600 dscfm, using a baghouse* for particulate control, constructed in 2002, and exhausting to stack152-4.

(4) One (1) Starch Mixer 2, identified as 152-5, with a maximum air throughput of 1,000 dscfm, using a baghouse* for particulate control, constructed in 2002, and exhausting to stack 152-5.

(5) One (1) Base Bin, identified as 152-6, with a maximum throughput of 15 tons/hr, using a baghouse** for particulate control, constructed in 2003, and exhausting to stack 152-6.

(6) One (1) Mixer 3-4 Transfer Dust Collector, identified as unit 152-7, with a maximum air throughput of 500 dscfm, using a baghouse** for particulate control, constructed in 2004, and exhausting to stack 152-7.

(7) One (1) Starch Mixer 4 Filter Receiver, identified as unit 152-8, with a maximum air throughput of 600 dscfm, using a baghouse** for particulate control, constructed in 2004, and exhausting to stack 152-8.

(8) One (1) Starch Mixer 4, identified as unit 152-9, with a maximum air throughput of 20 dscfm, using a baghouse** for particulate control, constructed in 2004, and exhausting to stack 152-9.

(9) One (1) Starch Mixer 3 Filter Receiver, identified as unit 152-10, with a maximum air 600 dscfm, using a baghouse** for particulate control, constructed in 2004, and exhausting to stack 152-10.

(10) One (1) Starch Mixer 3, identified as unit 152-11, with a maximum air throughput of 1,000 dscfm, using a baghouse* for particulate control, constructed in 2004 and approved in 2011 for modification, and exhausting to stack 152-11.

(11) One (1) Bulk Bag Dump Receiver, identified as 152-12, with a maximum air throughput of 800 dscfm, using a baghouse* for particulate control, constructed in 2004, and exhausting to stack 152-12.

(12) One (1) Product Silo, identified as Bin TF41820 (formerly unit 61-21), with a maximum throughput of 15 tons/hr, with a maximum air throughput of 589 dscfm, using a baghouse* for particulate control, constructed in 1976, modified in 1981, approved in 2010 for additional modification, and exhausting to stack 152-3.

(13) One (1) Starch Cooling and Conveying System, identified as TF41818 (formerly unit 581-2), with a maximum air throughput of 14,000 dscfm, using a baghouse* for particulate control, constructed in 1983 and approved in 2010 for modification, baghouse approved for replacement in 2020, and exhausting to stack TF41818.

(14) One (1) Blending Bin, identified as 152-15 (formerly unit TF41819), with a maximum air throughput of 4,000 dscfm, using a baghouse* for particulate control, approved in 2010 for construction, and exhausting to stack DC41819.

(15) One (1) Sodium Sulfate Conveying System, including a silo and receiver, identified as units 40-1A and 40-1B, with a maximum throughput of 15 tons/hr, with maximum air throughputs of 1,400 dscfm and 1,250 dscfm, using two baghouses* for particulate control, constructed prior to1968 and modified in 1998, and exhausting to stacks 40-1A and 40-1B.

(16) One (1) DSE North Packer, identified as unit 42-1, with a maximum throughput of 30 tons/hr, using a baghouse* for particulate control, constructed prior to 1968 and modified in 1996, and exhausting to stack 5.

(17) One (1) DSE Hopper #8, identified as unit 42-4, with a maximum throughput of 13.95 tons/hr, with a maximum air throughput of 4,200 dscfm, using a baghouse* for particulate control, constructed prior to 1968, baghouse approved for replacement in 2020, and exhausting to stack 17E.

(18) One (1) DSE Negative Receiver, identified as unit 42-6, with a maximum throughput of 10 tons/hr, using a baghouse* for particulate control, constructed prior to1968, and exhausting to stack 13.

(19) One (1) DSE South Packer, identified as unit 42-9, with a maximum throughput of 30 tons/hr, using a baghouse* for particulate control, constructed prior to 1968 and modified in 1996, and exhausting to stack 18.

(20) One (1) DSE Railcar Loading - East Track, identified as unit 42-11, with a maximum throughput of 18 tons/hr, using a baghouse* for particulate control, constructed in 1978, and exhausting to stack 20.

(21) One (1) DSE Railcar Loading - West Track, identified as unit 42-12, with a maximum throughput of 18 tons/hr, using a baghouse* for particulate control, constructed in 1978, and exhausting to stack 21.

(22) One (1) DSE Bulk Bag System, identified as unit 42-13, with a maximum throughput of 30 tons/hr, with a maximum air throughput of 4,500 dscfm, using a receiver/baghouse* for particulate control, constructed in 1997, and exhausting to stack 106.

(23) One (1) Dextrin Blend, identified as unit 61-14, with a maximum throughput of 7.5 tons/hr, using hopper/filter receiver using a baghouse** for particulate control, constructed prior to 1973, and exhausting to stack 61-14.

(24) One (1) CWS #7 Dryer Receiver, identified as unit 63-3, with a maximum air throughput of 2,000 dscfm, using a baghouse* for particulate control, constructed prior to 1968, baghouse approved for replacement in 2020, and exhausting to stack 47.

(25) One (1) CWS North Product, identified as unit 63-5, with a maximum throughput of 2.5 tons/hr, using a baghouse* for particulate control, constructed prior to 1974 and approved in 2021 for modification, and exhausting to stack 49.

(26) One (1) CWS Packer, identified as unit 63-9, with a maximum throughput of 20 tons/hr, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 50.

(27) One (1) CWS #9 and #10 Dryers Receiver, identified as unit 63-15, with a maximum air throughput of 3,600 dscfm, using a baghouse* for particulate control, constructed in 1975 and modified in 2010, baghouse approved for replacement in 2020, and exhausting to stack 52.

(28) CWS #11 Dryer and CWS #12 and #13 Dryers, identified as units 63-16A and 63-16B, each with a maximum air throughput of 3,300 dscfm, using two baghouses* for particulate control, constructed prior to August 7, 1977, and exhausting to stacks 54A and 54B.

(29) One (1) DSW Negative Receiver, identified as unit 63-20, with a maximum throughput of 5 tons/hr, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 56.

(30) One (1) Negative Receiver, identified as unit 71-3, with a maximum throughput of 15 tons/hr, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 71-3.

(31) One (1) DSW Bulk Car Loading, identified as unit 71-8, with a maximum throughput of 15 tons/hr, using a baghouse* for particulate control, constructed in 1971, and exhausting to stack 72.

(32) One (1) RSP South Bulk Bag Packing, identified as unit 577-1, with a maximum throughput of 15 tons/hr, using a baghouse* for particulate control, constructed in 1978, and exhausting to stack 77.

(33) One (1) FG Bulk Bag Bin Vent, identified as unit FA-60582, with a maximum throughput of 18 tons/hr, with a maximum air throughput of 3,800 dscfm, using a baghouse** for particulate control, constructed in 2003, and exhausting to stack

FA-60582.

(34) One (1) RSP South Packing Line, identified as unit 577-3, with a maximum throughput of 18 tons/hr, using a baghouse* for particulate control, constructed in 1978, and exhausting to stack 79.

(35) One (1) RSP Bulk Loading System A, identified as unit 577-4, with a maximum throughput of 18 tons/hr, using a baghouse* for particulate control, constructed in 1978, and exhausting to stack 80.

(36) One (1) RSP Bulk Loading Fugitive Dust Collector**, identified as unit 577-4A, with a maximum throughput of 18 tons/hr and an actual throughput of 18 lbs/hr, constructed in 1986, and exhausting to stack 81.

(37) One (1) aspiration line, constructed in 2017, assisting air flow within the DSS bulk loadout screener SR60585, and exhausting to RSP Bulk Loading Fugitive Dust Collector, 577-4A.

(38) One (1) CWS Conveying Cyclone Operation, identified as unit 578-1, with a maximum throughput of 7.5 tons/hr, using a baghouse** for particulate control, returned to service in 2008, and exhausting through stack 578-1.

(39) One (1) CWS Packing Hopper, identified as unit 578-2, with a maximum throughput of 1 tons/hr, using a baghouse* for particulate control, constructed in 1978, and exhausting to stack 89.

(40) One (1) CWS Milling System, identified as unit 578-3, with a maximum throughput of 1.5 tons/hr, using a baghouse* for particulate control, constructed in 1978, and approved for modification in 2018, exhausting to stack 578-3, consisting of one (1) Aspiration Line, constructed in 2018, assisting air flow within the CWS Milling System, and a fine grind mill, using a cyclone (CY-41146) for particulate control, and exhausting to stack 578-3.

(41) One (1) Drum A Product Receiver, identified as DC700, with a maximum flow rate of 1750 dscfm, constructed in 1978, modified on April 13, 2016 and 2018, using a dust collector for control, and exhausting to stack 578-4.

(42) One (1) Drum B Product Receiver, identified as DC701, with a maximum flow rate of 1750 dscfm, constructed in 1978, modified on April 13, 2016 and 2018, using a dust collector for control, and exhausting to stack 578-5.

(43) One (1) Product Bin 93, identified as unit TF31993 (formerly unit TF31901), with a maximum air throughput of 3,000 dscfm, using product recovery DC-31993* for particulate control, constructed in 2004 and approved in 2015 for modification, and exhausting to stack 1-158.

(44) One (1) Product Bin 92, identified as unit TF31992 (formerly unit TF31902), with a maximum air throughput of 2,000 dscfm, using product recovery DC-31992* for particulate control, constructed in 2004 and approved in 2015 for modification, and exhausting to stack 2-158.

(45) One (1) Product Bin 91, identified as unit TF31991, with a maximum air throughput of 2,000 dscfm, using product recovery DC-31991* for particulate control, constructed in 2004 and approved in 2015 for modification, and exhausting to stack 3-158.

(46) One (1) Surge Tank Bin 158-3, identified as unit SH31913, with a maximum air throughput of 200 dscfm, using product recovery DC-31911** for particulate control, constructed in 2004, and exhausting to stack 7-158.

(47) One (1) Bulk Bag Unload Bin 158-4, identified as unit DC-31900 with a maximum air throughput of 600 dscfm, using a dust collector* for particulate control, constructed in 2004, and exhausting to stack 8-158.

(48) One (1) FBR1 Exhaust, identified as unit TR31912, with a maximum air throughput of 8,800 dscfm, using product recovery metal filters** for particulate control, constructed in 2004, and exhausting to stack 5-158.

(49) One (1) FBR1 Cooling System, identified as TR31913, approved in 2014 for installation, with a product throughput of 15,000 pounds per hour, using a cyclone (CY31917)* and baghouse (DC31917)* for product recovery and particulate control, and exhausting to stack 9-158.

(50) One (1) starch dryer, identified as unit PAC-1, with a maximum production rate of 300 lbs/hr, using a product collector/cyclone and dust collector* for particulate control, constructed in 2005, and exhausting to stack PAC-1.

(51) One (1) distillation system, identified as PAC-2, using a scrubber for propylene oxide control and exhausting to stack PAC-2.

(52) One (1) Line 1 South Packing Hopper, identified as unit 5549-22, with a maximum air throughput of 4,800 dscfm, using a baghouse* for particulate control, constructed in 2006, and exhausting to stack 5549-22.

(53) Three (3) Base Bins (80, 81, and 82), identified as units TF31980, TF31981, and TF31982, respectively, each with a maximum air throughput of 1,275 dscfm, using product recovery DC31980*, DC31981*, and DC31982*, respectively, for particulate control, constructed in 2016, and exhausting to stacks 10-158, 11-158, and 12-158.

(54) One (1) FBR2 Exhaust, identified as unit TR31922, with a maximum air throughput of 6,000 dscfm, using product recovery metal filters* for particulate control, constructed in 2016, and exhausting to stack 14-158.

(55) One (1) FBR2 Cooling Reactor, identified as unit TR31923, with a maximum air throughput of 4,300 dscfm, using product recovery metal filters* for particulate control, constructed in 2016, and exhausting to stack 15-158.

(56) One (1) Product Bin 90, identified as unit TF31990, using product recovery DC31990* for particulate control, with a maximum air throughput of 2,200 dscfm, constructed in 2016, and exhausting to stack 13-158.

(57) One (1) Base Bin, identified as TF41822, constructed in 2017, with a maximum air throughput of 2,060 dscfm, using product recovery DC41822* as particulate control, and exhausting to stack 152-13.

(58) One (1) DSW Product Silo, identified as unit TF34031, constructed in 2019, with a maximum storage capacity of 45 tons and a maximum throughput of 1.75 tons per hour, using filter DC34031 for particulate control, exhausting to stack S34031.

(59) One (1) DSW Product Silo, identified as unit TF34032, constructed in 2019, with

a maximum storage capacity of 45 tons and a maximum throughput of 1.75 tons per hour, using filter DC34032 for particulate control, exhausting to stack S34032.

(60) One (1) DSW Product Silo, identified as unit TF34033, constructed in 2019, with a maximum storage capacity of 45 tons and a maximum throughput of 1.75 tons per hour, using filter DC34033 for particulate control, exhausting to stack S34033.

(61) One (1) DSW Product Silo, identified as unit TF34034, constructed in 2019, with a maximum storage capacity of 45 tons and a maximum throughput of 1.75 tons per hour, using filter DC34034 for particulate control, exhausting to stack S34034.

(62) One (1) Product Bin 94, identified asTF31994, approved in 2019 for construction, with a maximum air throughput of 3,000 dscfm, using product recovery DC-31994 * for particulate control, and exhausting to stack 25-158.

(63) One (1) Base Bin 83, identified as unit TF31983, approved in 2019 for construction, with a maximum air throughput of 1,275 dscfm, using product recovery DC31983 * for particulate control, and exhausting to stack 24-158.

(64) One (1) FBR3 Reactor, identified as unit TR31932, approved in 2019 for construction, and with a maximum air throughput of 6,000 dscfm, using product recovery metal filters * for particulate control, exhausting to stack 19-158.

(65) One (1) FBR3 Cooling Reactor, identified as unit TR31933, approved in 2019 for construction, with a maximum air throughput of 4,300 dscfm, using product recovery metal filters * for particulate control, and exhausting to stack 20-158.

*The control device is considered both integral to the process and inherent to the process for CAM applicability. Inherent process equipment is not subject to Compliance Assurance Monitoring (CAM).

**The control device is considered inherent to the process for CAM applicability. Inherent process equipment is not subject to Compliance Assurance Monitoring (CAM).

A.3 Specifically Regulated Insignificant Activities [326 IAC 2-7-1(21)][326 IAC 2-7-4(c)][326 IAC 2-7-5(14)]

This stationary source also includes the following insignificant activities which are specifically regulated, as defined in 326 IAC 2-7-1(21):

(a) Stationary fire pump engines, including:

(1) One (1) 210-horsepower diesel-fired emergency fire pump engine, identified as FP1, constructed in 2003. Under 40 CFR 63, Subpart ZZZZ, FP1 is considered an existing affected source.

(2) One (1) 300-horsepower diesel-fired emergency fire pump engine, identified as FP2, constructed in 2003. Under 40 CFR 63, Subpart ZZZZ, FP2 is considered an existing affected source.

(3) One (1) 300-horsepower diesel-fired emergency fire pump engine, identified as FP3, constructed in 2006. Under 40 CFR 63, Subpart ZZZZ, FP3 is considered a new affected source. Under 40 CFR 60, Subpart IIII, FP3 is considered an affected facility.

(b) Combustion related activities including spaces heaters, process heaters, or boilers using natural gas-fired with heat input equal to or less than ten million (10,000,000) British thermal units per hour:

(1) One (1) process heater, natural gas fired, with maximum heat input capacity of 5.1 MMBtu/hr, identified as emission unit YX31914A, constructed in 2004 and venting out stack 158-6.

(2) One (1) natural gas-fired FBR2 Burner, identified as unit FH31924, with a maximum capacity of 3.0 MMBtu/hr, constructed in 2016, and exhausting to stack 16-158.

(3) Two (2) natural gas-fired Air Heater Burners, identified as Air Heater 1 and Air Heater 2, units EF31926A and EF31927A, respectively, constructed in 2016, each with a maximum heat input capacity of 0.4 MMBtu/hr, and exhausting to stacks 17-158 and 18-158.

(4) Drover CWS direct-fired air heaters, with a maximum total heat input capacity of 4.50 MMBtu/hr.

(5) One (1) natural gas-fired FBR3 Burner, identified as unit FH31934, approved in 2019 for construction, with a maximum capacity of 3.0 MMBtu/hr, and exhausting to stack 21-158.

(6) One (1) natural gas-fired Dehumidifier Air Heater 1, identified as EF31936A, approved in 2019 for construction, with a maximum heat input capacity of 0.4 MMBtu/hr, and exhausting to stack 22-158.

(7) One (1) natural gas-fired Dehumidifier Air Heater 2, identified as EF31937A, approved in 2019 for construction, with a maximum heat input capacity of 0.4 MMBtu/hr, and exhausting to stack 23-158.

(c) Two (2) degreasing operations, identified as D1 and D2, each with a maximum annual solvent usage of 465 gallons, and each resulting in potential uncontrolled VOC emissions of less than three (3) pounds per hour and fifteen (15) pounds per day.

(d) Paved and unpaved roads and parking lots with public access.

(e) Emissions from a laboratory, as defined in 326 IAC 2-7-1(21)(G).

(f) A gasoline fuel transfer dispensing operation handling less than or equal to 1,300 gallons per day and less than 10,000 gallons per month, filling storage tanks having a capacity equal to or less than 10,500 gallons.

Under 40 CFR 63, Subpart CCCCCC, this is considered an existing affected source.

(g) A petroleum fuel other than gasoline dispensing facility, having a storage tank capacity less than or equal to 10,500 gallons, and dispensing 3,500 gallons per day or less.

(h) Storage tanks with capacity less than or equal to 1,000 gallons and annual throughputs equal to or less than 12,000 gallons.

(i) Vessels storing the following: Lubricating oils, Hydraulic oils, Machining oils, Machining fluids.

(j) Grinding and machining operations controlled with fabric filters, scrubbers, mist collectors, wet collectors, and electrostatic precipitators with a design grain loading of less than or equal to 0.03 grains per actual cubic foot and a gas flow rate less than or equal to 4,000 actual cubic feet per minute, including the following: abrasive blasting, identified as S1.

(k) Three (3) acetic acid storage tanks, identified as T1, with a capacity no greater than sixteen thousand (16,000) gallons each.

(l) Four (4) hydrochloric acid storage tanks, identified as T2, with a capacity no greater than sixteen thousand (16,000) gallons each.

(m) Ten (10) small batch reactors, identified as Tanks 190, 191, 192, 193, 200, 201, 203, 211, 212, and 213, using no controls and exhausting to stacks 190, 191, 193, 200, 201, 203, 211, 212, and 213, respectively.

(n) Twenty-one (21) steeping tanks, identified as ST1 through ST21, permitted in 2017, and exhausting to Stacks ST1 through ST21.

(o) Seven (7) Millhouse vent fans, permitted in 2017.

(p) Six (6) portable diesel fuel oil-fired heaters, constructed in 2015, each with a maximum heat input capacity of 0.41 MMBtu/hr and a sulfur content of 0.0015%.

(q) Twenty-five (25) portable diesel fuel oil-fired heaters, constructed in 2016, each with a maximum heat input capacity of 0.41 MMBtu/hr and a sulfur content of 0.0015%.

A.4 Part 70 Permit Applicability [326 IAC 2-7-2]

This stationary source is required to have a Part 70 permit by 326 IAC 2-7-2 (Applicability) because:

(a) It is a major source, as defined in 326 IAC 2-7-1(22);

(b) It is a source in a source category designated by the United States Environmental Protection Agency (U.S. EPA) under 40 CFR 70.3 (Part 70 - Applicability).

SECTION B GENERAL CONDITIONS

B.1 Definitions [326 IAC 2-7-1]

Terms in this permit shall have the definition assigned to such terms in the referenced regulation. In the absence of definitions in the referenced regulation, the applicable definitions found in the statutes or regulations (IC 13-11, 326 IAC 1-2 and 326 IAC 2-7) shall prevail.

B.2 Permit Term [326 IAC 2-7-5(2)][326 IAC 2-1.1-9.5][326 IAC 2-7-4(a)(1)(D)][IC 13-15-3-6(a)]

(a) This permit, T097-42340-00042, is issued for a fixed term of five (5) years from the issuance date of this permit, as determined in accordance with IC 4-21.5-3-5(f) and IC 13-15-5-3. Subsequent revisions, modifications, or amendments of this permit do not affect the expiration date of this permit.

(b) If IDEM, OAQ, upon receiving a timely and complete renewal permit application, fails to issue or deny the permit renewal prior to the expiration date of this permit, this existing permit shall not expire and all terms and conditions shall continue in effect, including any permit shield provided in 326 IAC 2-7-15, until the renewal permit has been issued or denied.

B.3 Term of Conditions [326 IAC 2-1.1-9.5]

Notwithstanding the permit term of a permit to construct, a permit to operate, or a permit modification, any condition established in a permit issued pursuant to a permitting program approved in the state implementation plan shall remain in effect until:

(a) the condition is modified in a subsequent permit action pursuant to Title I of the Clean Air Act; or

(b) the emission unit to which the condition pertains permanently ceases operation.

B.4 Enforceability [326 IAC 2-7-7] [IC 13-17-12]

Unless otherwise stated, all terms and conditions in this permit, including any provisions designed to limit the source's potential to emit, are enforceable by IDEM, the United States Environmental Protection Agency (U.S. EPA) and by citizens in accordance with the Clean Air Act.

B.5 Severability [326 IAC 2-7-5(5)]

The provisions of this permit are severable; a determination that any portion of this permit is invalid shall not affect the validity of the remainder of the permit.

B.6 Property Rights or Exclusive Privilege [326 IAC 2-7-5(6)(D)]

This permit does not convey any property rights of any sort or any exclusive privilege.

B.7 Duty to Provide Information [326 IAC 2-7-5(6)(E)]

(a) The Permittee shall furnish to IDEM, OAQ, within a reasonable time, any information that IDEM, OAQ may request in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. Upon request, the Permittee shall also furnish to IDEM, OAQ copies of records required to be kept by this permit.

(b) For information furnished by the Permittee to IDEM, OAQ, the Permittee may include a claim of confidentiality in accordance with 326 IAC 17.1. When furnishing copies of requested records directly to U. S. EPA, the Permittee may assert a claim of confidentiality in accordance with 40 CFR 2, Subpart B.

B.8 Certification [326 IAC 2-7-4(f)][326 IAC 2-7-6(1)][326 IAC 2-7-5(3)(C)]

(a) A certification required by this permit meets the requirements of 326 IAC 2-7-6(1) if:

(1) it contains a certification by a "responsible official" as defined by 326 IAC 2-7-1(35), and

(2) the certification states that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

(b) The Permittee may use the attached Certification Form, or its equivalent with each submittal requiring certification. One (1) certification may cover multiple forms in one (1) submittal.

(c) A "responsible official" is defined at 326 IAC 2-7-1(35).

B.9 Annual Compliance Certification [326 IAC 2-7-6(5)]

(a) The Permittee shall annually submit a compliance certification report which addresses the status of the source’s compliance with the terms and conditions contained in this permit, including emission limitations, standards, or work practices. All certifications shall cover the time period from January 1 to December 31 of the previous year, and shall be submitted no later than April 15 of each year to:

Indiana Department of Environmental Management
Compliance and Enforcement Branch, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

and

United States Environmental Protection Agency, Region 5
Air and Radiation Division, Air Enforcement Branch - Indiana (AE-17J)
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

(b) The annual compliance certification report required by this permit shall be considered timely if the date postmarked on the envelope or certified mail receipt, or affixed by the shipper on the private shipping receipt, is on or before the date it is due. If the document is submitted by any other means, it shall be considered timely if received by IDEM, OAQ on or before the date it is due.

(c) The annual compliance certification report shall include the following:

(1) The appropriate identification of each term or condition of this permit that is the basis of the certification;

(2) The compliance status;

(3) Whether compliance was continuous or intermittent;

(4) The methods used for determining the compliance status of the source, currently and over the reporting period consistent with 326 IAC 2-7-5(3); and

(5) Such other facts, as specified in Sections D of this permit, as IDEM, OAQ may require to determine the compliance status of the source.

The submittal by the Permittee does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

B.10 Preventive Maintenance Plan [326 IAC 2-7-5(12)][326 IAC 1-6-3]

(a) A Preventive Maintenance Plan meets the requirements of 326 IAC 1-6-3 if it includes, at a minimum:

(1) Identification of the individual(s) responsible for inspecting, maintaining, and repairing emission control devices;

(2) A description of the items or conditions that will be inspected and the inspection schedule for said items or conditions; and

(3) Identification and quantification of the replacement parts that will be maintained in inventory for quick replacement.

The Permittee shall implement the PMPs.

(b) If required by specific condition(s) in Section D of this permit where no PMP was previously required, the Permittee shall prepare and maintain Preventive Maintenance Plans (PMPs) no later than ninety (90) days after issuance of this permit or ninety (90) days after initial start-up, whichever is later, including the following information on each facility:

(1) Identification of the individual(s) responsible for inspecting, maintaining, and repairing emission control devices;

(2) A description of the items or conditions that will be inspected and the inspection schedule for said items or conditions; and

(3) Identification and quantification of the replacement parts that will be maintained in inventory for quick replacement.

If, due to circumstances beyond the Permittee's control, the PMPs cannot be prepared and maintained within the above time frame, the Permittee may extend the date an additional ninety (90) days provided the Permittee notifies:

Indiana Department of Environmental Management
Compliance and Enforcement Branch, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

The PMP extension notification does not require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

The Permittee shall implement the PMPs.

(c) A copy of the PMPs shall be submitted to IDEM, OAQ upon request and within a reasonable time, and shall be subject to review and approval by IDEM, OAQ. IDEM, OAQ may require the Permittee to revise its PMPs whenever lack of proper maintenance causes or is the primary contributor to an exceedance of any limitation on emissions. The PMPs and their submittal do not require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

(d) To the extent the Permittee is required by 40 CFR Part 60/63 to have an Operation Maintenance, and Monitoring (OMM) Plan for a unit, such Plan is deemed to satisfy the PMP requirements of 326 IAC 1-6-3 for that unit.

B.11 Emergency Provisions [326 IAC 2-7-16]

(a) An emergency, as defined in 326 IAC 2-7-1(12), is not an affirmative defense for an action brought for noncompliance with a federal or state health-based emission limitation.

(b) An emergency, as defined in 326 IAC 2-7-1(12), constitutes an affirmative defense to an action brought for noncompliance with a technology-based emission limitation if the affirmative defense of an emergency is demonstrated through properly signed, contemporaneous operating logs or other relevant evidence that describe the following:

(1) An emergency occurred and the Permittee can, to the extent possible, identify the causes of the emergency;

(2) The permitted facility was at the time being properly operated;

(3) During the period of an emergency, the Permittee took all reasonable steps to minimize levels of emissions that exceeded the emission standards or other requirements in this permit;

(4) For each emergency lasting one (1) hour or more, the Permittee notified IDEM, OAQ within four (4) daytime business hours after the beginning of the emergency, or after the emergency was discovered or reasonably should have been discovered;

Telephone Number: 1-800-451-6027 (ask for Office of Air Quality, Compliance and Enforcement Branch), or
Telephone Number: 317-233-0178 (ask for Office of Air Quality, Compliance and Enforcement Branch)
Facsimile Number: 317-233-6865

(5) For each emergency lasting one (1) hour or more, the Permittee submitted the attached Emergency Occurrence Report Form or its equivalent, either by mail or facsimile to:

Indiana Department of Environmental Management
Compliance and Enforcement Branch, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

within two (2) working days of the time when emission limitations were exceeded due to the emergency.

The notice fulfills the requirement of 326 IAC 2-7-5(3)(C)(ii) and must contain the following:

(A) A description of the emergency;

(B) Any steps taken to mitigate the emissions; and

(C) Corrective actions taken.

The notification which shall be submitted by the Permittee does not require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

(6) The Permittee immediately took all reasonable steps to correct the emergency.

(c) In any enforcement proceeding, the Permittee seeking to establish the occurrence of an emergency has the burden of proof.

(d) This emergency provision supersedes 326 IAC 1-6 (Malfunctions). This permit condition is in addition to any emergency or upset provision contained in any applicable requirement.

(e) The Permittee seeking to establish the occurrence of an emergency shall make records available upon request to ensure that failure to implement a PMP did not cause or contribute to an exceedance of any limitations on emissions. However, IDEM, OAQ may require that the Preventive Maintenance Plans required under 326 IAC 2-7-4(c)(8) be revised in response to an emergency.

(f) Failure to notify IDEM, OAQ by telephone or facsimile of an emergency lasting more than one (1) hour in accordance with (b)(4) and (5) of this condition shall constitute a violation of 326 IAC 2-7 and any other applicable rules.

(g) If the emergency situation causes a deviation from a technology-based limit, the Permittee may continue to operate the affected emitting facilities during the emergency provided the Permittee immediately takes all reasonable steps to correct the emergency and minimize emissions.

B.12 Permit Shield [326 IAC 2-7-15][326 IAC 2-7-20][326 IAC 2-7-12]

(a) Pursuant to 326 IAC 2-7-15, the Permittee has been granted a permit shield. The permit shield provides that compliance with the conditions of this permit shall be deemed compliance with any applicable requirements as of the date of permit issuance, provided that either the applicable requirements are included and specifically identified in this permit or the permit contains an explicit determination or concise summary of a determination that other specifically identified requirements are not applicable. The Indiana statutes from IC 13 and rules from 326 IAC, referenced in conditions in this permit, are those applicable at the time the permit was issued. The issuance or possession of this permit shall not alone constitute a defense against an alleged violation of any law, regulation or standard, except for the requirement to obtain a Part 70 permit under 326 IAC 2-7 or for applicable requirements for which a permit shield has been granted.

This permit shield does not extend to applicable requirements which are promulgated after the date of issuance of this permit unless this permit has been modified to reflect such new requirements.

(b) If, after issuance of this permit, it is determined that the permit is in nonconformance with an applicable requirement that applied to the source on the date of permit issuance, IDEM, OAQ shall immediately take steps to reopen and revise this permit and issue a compliance order to the Permittee to ensure expeditious compliance with the applicable requirement until the permit is reissued. The permit shield shall continue in effect so long as the Permittee is in compliance with the compliance order.

(c) No permit shield shall apply to any permit term or condition that is determined after issuance of this permit to have been based on erroneous information supplied in the permit application. Erroneous information means information that the Permittee knew to be false, or in the exercise of reasonable care should have been known to be false, at the time the information was submitted.

(d) Nothing in 326 IAC 2-7-15 or in this permit shall alter or affect the following:

(1) The provisions of Section 303 of the Clean Air Act (emergency orders), including the authority of the U.S. EPA under Section 303 of the Clean Air Act;

(2) The liability of the Permittee for any violation of applicable requirements prior to or at the time of this permit's issuance;

(3) The applicable requirements of the acid rain program, consistent with Section 408(a) of the Clean Air Act; and

(4) The ability of U.S. EPA to obtain information from the Permittee under Section 114 of the Clean Air Act.

(e) This permit shield is not applicable to any change made under 326 IAC 2-7-20(b)(2) (Sections 502(b)(10) of the Clean Air Act changes) and 326 IAC 2-7-20(c)(2) (trading based on State Implementation Plan (SIP) provisions).

(f) This permit shield is not applicable to modifications eligible for group processing until after IDEM, OAQ, has issued the modifications. [326 IAC 2-7-12(c)(7)]

(g) This permit shield is not applicable to minor Part 70 permit modifications until after IDEM, OAQ, has issued the modification. [326 IAC 2-7-12(b)(8)]

B.13 Prior Permits Superseded [326 IAC 2-1.1-9.5][326 IAC 2-7-10.5]

(a) All terms and conditions of permits established prior to T097-42340-00042 and issued pursuant to permitting programs approved into the state implementation plan have been either:

(1) incorporated as originally stated,

(2) revised under 326 IAC 2-7-10.5, or

(3) deleted under 326 IAC 2-7-10.5.

(b) Provided that all terms and conditions are accurately reflected in this permit, all previous registrations and permits are superseded by this Part 70 operating permit.

B.14 Termination of Right to Operate [326 IAC 2-7-10][326 IAC 2-7-4(a)]

The Permittee's right to operate this source terminates with the expiration of this permit unless a timely and complete renewal application is submitted at least nine (9) months prior to the date of expiration of the source’s existing permit, consistent with 326 IAC 2-7-3 and 326 IAC 2-7-4(a).

B.15 Permit Modification, Reopening, Revocation and Reissuance, or Termination [326 IAC 2-7-5(6)(C)][326 IAC 2-7-8(a)][326 IAC 2-7-9]

(a) This permit may be modified, reopened, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a Part 70 Operating Permit modification, revocation and reissuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any condition of this permit. [326 IAC 2-7-5(6)(C)] The notification by the Permittee does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

(b) This permit shall be reopened and revised under any of the circumstances listed in IC 13-15-7-2 or if IDEM, OAQ determines any of the following:

(1) That this permit contains a material mistake.

(2) That inaccurate statements were made in establishing the emissions standards or other terms or conditions.

(3) That this permit must be revised or revoked to assure compliance with an applicable requirement. [326 IAC 2-7-9(a)(3)]

(c) Proceedings by IDEM, OAQ to reopen and revise this permit shall follow the same procedures as apply to initial permit issuance and shall affect only those parts of this permit for which cause to reopen exists. Such reopening and revision shall be made as expeditiously as practicable. [326 IAC 2-7-9(b)]

(d) The reopening and revision of this permit, under 326 IAC 2-7-9(a), shall not be initiated before notice of such intent is provided to the Permittee by IDEM, OAQ at least thirty (30) days in advance of the date this permit is to be reopened, except that IDEM, OAQ may provide a shorter time period in the case of an emergency. [326 IAC 2-7-9(c)]

B.16 Permit Renewal [326 IAC 2-7-3][326 IAC 2-7-4][326 IAC 2-7-8(e)]

(a) The application for renewal shall be submitted using the application form or forms prescribed by IDEM, OAQ and shall include the information specified in 326 IAC 2-7-4. Such information shall be included in the application for each emission unit at this source, except those emission units included on the trivial or insignificant activities list contained in 326 IAC 2-7-1(21) and 326 IAC 2-7-1(42). The renewal application does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

Request for renewal shall be submitted to:

Indiana Department of Environmental Management
Permit Administration and Support Section, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

(b) A timely renewal application is one that is:

(1) Submitted at least nine (9) months prior to the date of the expiration of this permit; and

(2) If the date postmarked on the envelope or certified mail receipt, or affixed by the shipper on the private shipping receipt, is on or before the date it is due. If the

document is submitted by any other means, it shall be considered timely if received by IDEM, OAQ on or before the date it is due.

(c) If the Permittee submits a timely and complete application for renewal of this permit, the source's failure to have a permit is not a violation of 326 IAC 2-7 until IDEM, OAQ takes final action on the renewal application, except that this protection shall cease to apply if, subsequent to the completeness determination, the Permittee fails to submit by the deadline specified, pursuant to 326 IAC 2-7-4(a)(2)(D), in writing by IDEM, OAQ any additional information identified as being needed to process the application.

B.17 Permit Amendment or Modification [326 IAC 2-7-11][326 IAC 2-7-12]

(a) Permit amendments and modifications are governed by the requirements of 326 IAC 2-7-11 or 326 IAC 2-7-12 whenever the Permittee seeks to amend or modify this permit.

(b) Any application requesting an amendment or modification of this permit shall be submitted to:

Indiana Department of Environmental Management
Permit Administration and Support Section, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

Any such application does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

(c) The Permittee may implement administrative amendment changes addressed in the request for an administrative amendment immediately upon submittal of the request. [326 IAC 2-7-11(c)(3)]

B.18 Permit Revision Under Economic Incentives and Other Programs [326 IAC 2-7-5(8)][326 IAC 2-7-12(b)(2)]

(a) No Part 70 permit revision or notice shall be required under any approved economic incentives, marketable Part 70 permits, emissions trading, and other similar programs or processes for changes that are provided for in a Part 70 permit.

(b) Notwithstanding 326 IAC 2-7-12(b)(1) and 326 IAC 2-7-12(c)(1), minor Part 70 permit modification procedures may be used for Part 70 modifications involving the use of economic incentives, marketable Part 70 permits, emissions trading, and other similar approaches to the extent that such minor Part 70 permit modification procedures are explicitly provided for in the applicable State Implementation Plan (SIP) or in applicable requirements promulgated or approved by the U.S. EPA.

B.19 Operational Flexibility [326 IAC 2-7-20][326 IAC 2-7-10.5]

(a) The Permittee may make any change or changes at the source that are described in 326 IAC 2-7-20(b) or (c) without a prior permit revision, if each of the following conditions is met:

(1) The changes are not modifications under any provision of Title I of the Clean Air Act;

(2) Any preconstruction approval required by 326 IAC 2-7-10.5 has been obtained;

(3) The changes do not result in emissions which exceed the limitations provided in this permit (whether expressed herein as a rate of emissions or in terms of total emissions);

(4) The Permittee notifies the:

Indiana Department of Environmental Management
Permit Administration and Support Section, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

and

United States Environmental Protection Agency, Region 5
Air and Radiation Division, Regulation Development Branch - Indiana (AR-18J)
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

in advance of the change by written notification at least ten (10) days in advance of the proposed change. The Permittee shall attach every such notice to the Permittee's copy of this permit; and

(5) The Permittee maintains records on-site, on a rolling five (5) year basis, which document all such changes and emission trades that are subject to 326 IAC 2-7-20(b)(1) and (c)(1). The Permittee shall make such records available, upon reasonable request, for public review.

Such records shall consist of all information required to be submitted to IDEM, OAQ in the notices specified in 326 IAC 2-7-20(b)(1) and (c)(1).

(b) The Permittee may make Section 502(b)(10) of the Clean Air Act changes (this term is defined at 326 IAC 2-7-1(37)) without a permit revision, subject to the constraint of 326 IAC 2-7-20(a). For each such Section 502(b)(10) of the Clean Air Act change, the required written notification shall include the following:

(1) A brief description of the change within the source;

(2) The date on which the change will occur;

(3) Any change in emissions; and

(4) Any permit term or condition that is no longer applicable as a result of the change.

The notification which shall be submitted is not considered an application form, report or compliance certification. Therefore, the notification by the Permittee does not require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

(c) Emission Trades [326 IAC 2-7-20(c)]
The Permittee may trade emissions increases and decreases at the source, where the applicable SIP provides for such emission trades without requiring a permit revision, subject to the constraints of Section (a) of this condition and those in 326 IAC 2-7-20(c).

(d) Alternative Operating Scenarios [326 IAC 2-7-20(d)]
The Permittee may make changes at the source within the range of alternative operating scenarios that are described in the terms and conditions of this permit in accordance with 326 IAC 2-7-5(9). No prior notification of IDEM, OAQ or U.S. EPA is required.

(e) Backup fuel switches specifically addressed in, and limited under, Section D of this permit shall not be considered alternative operating scenarios. Therefore, the notification requirements of part (a) of this condition do not apply.

B.20 Source Modification Requirement [326 IAC 2-7-10.5]

A modification, construction, or reconstruction is governed by the requirements of 326 IAC 2.

B.21 Inspection and Entry [326 IAC 2-7-6][IC 13-14-2-2][IC 13-30-3-1][IC 13-17-3-2]

Upon presentation of proper identification cards, credentials, and other documents as may be required by law, and subject to the Permittee’s right under all applicable laws and regulations to assert that the information collected by the agency is confidential and entitled to be treated as such, the Permittee shall allow IDEM, OAQ, U.S. EPA, or an authorized representative to perform the following:

(a) Enter upon the Permittee's premises where a Part 70 source is located, or emissions related activity is conducted, or where records must be kept under the conditions of this permit;

(b) As authorized by the Clean Air Act, IC 13-14-2-2, IC 13-17-3-2, and IC 13-30-3-1, have access to and copy any records that must be kept under the conditions of this permit;

(c) As authorized by the Clean Air Act, IC 13-14-2-2, IC 13-17-3-2, and IC 13-30-3-1, inspect any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under this permit;

(d) As authorized by the Clean Air Act, IC 13-14-2-2, IC 13-17-3-2, and IC 13-30-3-1, sample or monitor substances or parameters for the purpose of assuring compliance with this permit or applicable requirements; and

(e) As authorized by the Clean Air Act, IC 13-14-2-2, IC 13-17-3-2, and IC 13-30-3-1, utilize any photographic, recording, testing, monitoring, or other equipment for the purpose of assuring compliance with this permit or applicable requirements.

B.22 Transfer of Ownership or Operational Control [326 IAC 2-7-11]

(a) The Permittee must comply with the requirements of 326 IAC 2-7-11 whenever the Permittee seeks to change the ownership or operational control of the source and no other change in the permit is necessary.

(b) Any application requesting a change in the ownership or operational control of the source shall contain a written agreement containing a specific date for transfer of permit responsibility, coverage and liability between the current and new Permittee. The application shall be submitted to:

Indiana Department of Environmental Management
Permit Administration and Support Section, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

Any such application does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

(c) The Permittee may implement administrative amendment changes addressed in the request for an administrative amendment immediately upon submittal of the request. [326 IAC 2-7-11(c)(3)]

B.23 Annual Fee Payment [326 IAC 2-7-19] [326 IAC 2-7-5(7)][326 IAC 2-1.1-7]

(a) The Permittee shall pay annual fees to IDEM, OAQ within thirty (30) calendar days of receipt of a billing. Pursuant to 326 IAC 2-7-19(b), if the Permittee does not receive a bill from IDEM, OAQ the applicable fee is due April 1 of each year.

(b) Except as provided in 326 IAC 2-7-19(e), failure to pay may result in administrative enforcement action or revocation of this permit.

(c) The Permittee may call the following telephone numbers: 1-800-451-6027 or 317-233-4230 (ask for OAQ, Billing, Licensing, and Training Section), to determine the appropriate permit fee.

B.24 Credible Evidence [326 IAC 2-7-5(3)][326 IAC 2-7-6][62 FR 8314] [326 IAC 1-1-6]

For the purpose of submitting compliance certifications or establishing whether or not the Permittee has violated or is in violation of any condition of this permit, nothing in this permit shall preclude the use, including the exclusive use, of any credible evidence or information relevant to whether the Permittee would have been in compliance with the condition of this permit if the appropriate performance or compliance test or procedure had been performed.

SECTION C SOURCE OPERATION CONDITIONS

Entire Source

Emission Limitations and Standards [326 IAC 2-7-5(1)]

C.1 Opacity [326 IAC 5-1]

Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-1 (Applicability) and 326 IAC 5-1-3 (Temporary Alternative Opacity Limitations), opacity shall meet the following, unless otherwise stated in this permit:

(a) Opacity shall not exceed an average of thirty percent (30%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

(b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor) in a six (6) hour period.

C.2 Open Burning [326 IAC 4-1] [IC 13-17-9]

The Permittee shall not open burn any material except as provided in 326 IAC 4-1-3, 326 IAC 4-1-4 or 326 IAC 4-1-6. The previous sentence notwithstanding, the Permittee may open burn in accordance with an open burning approval issued by the Commissioner under 326 IAC 4-1-4.1.

C.3 Incineration [326 IAC 4-2] [326 IAC 9-1-2]

The Permittee shall not operate an incinerator except as provided in 326 IAC 4-2 or in this permit. The Permittee shall not operate a refuse incinerator or refuse burning equipment except as provided in 326 IAC 9-1-2 or in this permit.

C.4 Fugitive Dust Emissions [326 IAC 6-4]

The Permittee shall not allow fugitive dust to escape beyond the property line or boundaries of the property, right-of-way, or easement on which the source is located, in a manner that would violate 326 IAC 6-4 (Fugitive Dust Emissions). 326 IAC 6-4-2(4) is not federally enforceable.

C.5 Asbestos Abatement Projects [326 IAC 14-10] [326 IAC 18] [40 CFR 61, Subpart M]

(a) Notification requirements apply to each owner or operator. If the combined amount of regulated asbestos containing material (RACM) to be stripped, removed or disturbed is at least 260 linear feet on pipes or 160 square feet on other facility components, or at least thirty-five (35) cubic feet on all facility components, then the notification requirements of 326 IAC 14-10-3 are mandatory. All demolition projects require notification whether or not asbestos is present.

(b) The Permittee shall ensure that a written notification is sent on a form provided by the Commissioner at least ten (10) working days before asbestos stripping or removal work or before demolition begins, per 326 IAC 14-10-3, and shall update such notice as necessary, including, but not limited to the following:

(1) When the amount of affected asbestos containing material increases or decreases by at least twenty percent (20%); or

(2) If there is a change in the following:

(A) Asbestos removal or demolition start date;

(B) Removal or demolition contractor; or

(C) Waste disposal site.

(c) The Permittee shall ensure that the notice is postmarked or delivered according to the guidelines set forth in 326 IAC 14-10-3(c).

(d) The notice to be submitted shall include the information enumerated in 326 IAC 14-10-3(d).

All required notifications shall be submitted to:

Indiana Department of Environmental Management
Compliance and Enforcement Branch, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

The notice shall include a signed certification from the owner or operator that the information provided in this notification is correct and that only Indiana licensed workers and project supervisors will be used to implement the asbestos removal project. The notifications do not require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

(e) Procedures for Asbestos Emission Control
The Permittee shall comply with the applicable emission control procedures in 326 IAC 14-10-4 and 40 CFR 61.145(c). Per 326 IAC 14-10-1, emission control requirements are applicable for any removal or disturbance of RACM greater than three (3) linear feet on pipes or three (3) square feet on any other facility components or a total of at least 0.75 cubic feet on all facility components.

(f) Demolition and Renovation
The Permittee shall thoroughly inspect the affected facility or part of the facility where the demolition or renovation will occur for the presence of asbestos pursuant to 40 CFR 61.145(a).

(g) Indiana Licensed Asbestos Inspector
The Permittee shall comply with 326 IAC 14-10-1(a) that requires the owner or operator, prior to a renovation/demolition, to use an Indiana Licensed Asbestos Inspector to thoroughly inspect the affected portion of the facility for the presence of asbestos. The requirement to use an Indiana Licensed Asbestos inspector is not federally enforceable.

Testing Requirements [326 IAC 2-7-6(1)]

C.6 Performance Testing [326 IAC 3-6]

(a) For performance testing required by this permit, a test protocol, except as provided elsewhere in this permit, shall be submitted to:

Indiana Department of Environmental Management
Compliance and Enforcement Branch, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

no later than thirty-five (35) days prior to the intended test date. The protocol submitted by the Permittee does not require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

(b) The Permittee shall notify IDEM, OAQ of the actual test date at least fourteen (14) days prior to the actual test date. The notification submitted by the Permittee does not require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

(c) Pursuant to 326 IAC 3-6-4(b), all test reports must be received by IDEM, OAQ not later than forty-five (45) days after the completion of the testing. An extension may be granted by IDEM, OAQ if the Permittee submits to IDEM, OAQ a reasonable written explanation not later than five (5) days prior to the end of the initial forty-five (45) day period.

Compliance Requirements [326 IAC 2-1.1-11]

C.7 Compliance Requirements [326 IAC 2-1.1-11]

The commissioner may require stack testing, monitoring, or reporting at any time to assure compliance with all applicable requirements by issuing an order under 326 IAC 2-1.1-11. Any monitoring or testing shall be performed in accordance with 326 IAC 3 or other methods approved by the commissioner or the U. S. EPA.

Compliance Monitoring Requirements [326 IAC 2-7-5(1)][326 IAC 2-7-6(1)]

C.8 Compliance Monitoring [326 IAC 2-7-5(3)][326 IAC 2-7-6(1)][40 CFR 64][326 IAC 3-8]

(a) For new units:
Unless otherwise specified in the approval for the new emission unit(s), compliance monitoring for new emission units shall be implemented on and after the date of initial start-up.

(b) For existing units:
Unless otherwise specified in this permit, for all monitoring requirements not already legally required, the Permittee shall be allowed up to ninety (90) days from the date of permit issuance to begin such monitoring. If, due to circumstances beyond the Permittee's control, any monitoring equipment required by this permit cannot be installed and operated no later than ninety (90) days after permit issuance, the Permittee may extend the compliance schedule related to the equipment for an additional ninety (90) days provided the Permittee notifies:

Indiana Department of Environmental Management
Compliance and Enforcement Branch, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

in writing, prior to the end of the initial ninety (90) day compliance schedule, with full justification of the reasons for the inability to meet this date.

The notification which shall be submitted by the Permittee does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

(c) For monitoring required by CAM, at all times, the Permittee shall maintain the monitoring, including but not limited to, maintaining necessary parts for routine repairs of the monitoring equipment.

(d) For monitoring required by CAM, except for, as applicable, monitoring malfunctions, associated repairs, and required quality assurance or control activities (including, as applicable, calibration checks and required zero and span adjustments), the Permittee shall conduct all monitoring in continuous operation (or shall collect data at all required intervals) at all times that the pollutant-specific emissions unit is operating. Data recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities shall not be used for purposes of this part, including data averages and calculations, or fulfilling a minimum data availability requirement, if applicable. The owner or operator shall use all the data collected during all other periods in assessing the operation of the control device and associated control system. A monitoring malfunction is any sudden, infrequent, not reasonably preventable failure of the monitoring to provide valid data. Monitoring failures that are caused in part by poor maintenance or careless operation are not malfunctions.

C.9 Instrument Specifications [326 IAC 2-1.1-11] [326 IAC 2-7-5(3)] [326 IAC 2-7-6(1)]

(a) When required by any condition of this permit, an analog instrument used to measure a parameter related to the operation of an air pollution control device shall have a scale such that the expected maximum reading for the normal range shall be no less than twenty percent (20%) of full scale. The analog instrument shall be capable of measuring values outside of the normal range.

(b) The Permittee may request that the IDEM, OAQ approve the use of an instrument that does not meet the above specifications provided the Permittee can demonstrate that an alternative instrument specification will adequately ensure compliance with permit conditions requiring the measurement of the parameters.

Corrective Actions and Response Steps [326 IAC 2-7-5][326 IAC 2-7-6]

C.10 Emergency Reduction Plans [326 IAC 1-5-2] [326 IAC 1-5-3]

Pursuant to 326 IAC 1-5-2 (Emergency Reduction Plans; Submission):

(a) The Permittee shall maintain the most recently submitted written emergency reduction plans (ERPs) consistent with safe operating procedures.

(b) Upon direct notification by IDEM, OAQ that a specific air pollution episode level is in effect, the Permittee shall immediately put into effect the actions stipulated in the approved ERP for the appropriate episode level. [326 IAC 1-5-3]

C.11 Risk Management Plan [326 IAC 2-7-5(11)] [40 CFR 68]

If a regulated substance, as defined in 40 CFR 68, is present at a source in more than a threshold quantity, the Permittee must comply with the applicable requirements of 40 CFR 68.

C.12 Response to Excursions or Exceedances [40 CFR 64][326 IAC 3-8][326 IAC 2-7-5] [326 IAC 2-7-6]

(I) Upon detecting an excursion where a response step is required by the D Section, or an exceedance of a limitation, not subject to CAM, in this permit:

(a) The Permittee shall take reasonable response steps to restore operation of the emissions unit (including any control device and associated capture system) to its normal or usual manner of operation as expeditiously as practicable in accordance with good air pollution control practices for minimizing excess emissions.

(b) The response shall include minimizing the period of any startup, shutdown or malfunction. The response may include, but is not limited to, the following:

(1) initial inspection and evaluation;

(2) recording that operations returned or are returning to normal without operator action (such as through response by a computerized distribution control system); or

(3) any necessary follow-up actions to return operation to normal or usual manner of operation.

(c) A determination of whether the Permittee has used acceptable procedures in response to an excursion or exceedance will be based on information available, which may include, but is not limited to, the following:

(1) monitoring results;

(2) review of operation and maintenance procedures and records; and/or

(3) inspection of the control device, associated capture system, and the process.

(d) Failure to take reasonable response steps shall be considered a deviation from the permit.

(e) The Permittee shall record the reasonable response steps taken.

(II)

(a) CAM *Response to excursions or exceedances.*

(1) Upon detecting an excursion or exceedance, subject to CAM, the Permittee shall restore operation of the pollutant-specific emissions unit (including the control device and associated capture system) to its normal or usual manner of operation as expeditiously as practicable in accordance with good air pollution control practices for minimizing emissions. The response shall include minimizing the period of any startup, shutdown or malfunction and taking any necessary corrective actions to restore normal operation and prevent the likely recurrence of the cause of an excursion or exceedance (other than those caused by excused startup or shutdown conditions). Such actions may include initial inspection and evaluation, recording that operations returned to normal without operator action (such as through response by a computerized distribution control system), or any necessary follow-up actions to return operation to within the indicator range, designated condition, or below the applicable emission limitation or standard, as applicable.

(2) Determination of whether the Permittee has used acceptable procedures in response to an excursion or exceedance will be based on information available, which may include but is not limited to, monitoring results, review of operation and maintenance procedures and records, and inspection of the control device, associated capture system, and the process.

(b) If the Permittee identifies a failure to achieve compliance with an emission limitation, subject to CAM, or standard, subject to CAM, for which the approved monitoring did not provide an indication of an excursion or exceedance while providing valid data, or the results of compliance or performance testing document a need to modify the existing indicator ranges or designated conditions, the Permittee shall promptly notify the IDEM, OAQ and, if necessary, submit a proposed significant permit modification to this permit to address the necessary monitoring changes. Such a modification may include, but is not limited to, reestablishing indicator ranges or designated conditions, modifying the frequency of conducting monitoring and collecting data, or the monitoring of additional parameters.

(c) Based on the results of a determination made under paragraph (II)(a)(2) of this condition, the EPA or IDEM, OAQ may require the Permittee to develop and implement a Quality Improvement Plan (QIP). The Permittee shall develop and implement a QIP if notified to in writing by the EPA or IDEM, OAQ.

(d) Elements of a QIP:
The Permittee shall maintain a written QIP, if required, and have it available for inspection. The plan shall conform to 40 CFR 64.8 b (2).

(e) If a QIP is required, the Permittee shall develop and implement a QIP as expeditiously as practicable and shall notify the IDEM, OAQ if the period for completing the improvements contained in the QIP exceeds 180 days from the date on which the need to implement the QIP was determined.

(f) Following implementation of a QIP, upon any subsequent determination pursuant to paragraph (II)(a)(2) of this condition the EPA or the IDEM, OAQ may require that the Permittee make reasonable changes to the QIP if the QIP is found to have:

(1) Failed to address the cause of the control device performance problems; or

(2) Failed to provide adequate procedures for correcting control device performance problems as expeditiously as practicable in accordance with good air pollution control practices for minimizing emissions.

(g) Implementation of a QIP shall not excuse the Permittee from compliance with any existing emission limitation or standard, or any existing monitoring, testing, reporting or recordkeeping requirement that may apply under federal, state, or local law, or any other applicable requirements under the Act.

(h) *CAM recordkeeping requirements.*

(1) The Permittee shall maintain records of monitoring data, monitor performance data, corrective actions taken, any written quality improvement plan required pursuant to paragraph (II)(c) of this condition and any activities undertaken to implement a quality improvement plan, and other supporting information required to be maintained under this condition (such as data used to document the adequacy of monitoring, or records of monitoring maintenance or corrective actions). Section C - General Record Keeping Requirements of this permit contains the Permittee's obligations with regard to the records required by this condition.

(2) Instead of paper records, the owner or operator may maintain records on alternative media, such as microfilm, computer files, magnetic tape disks, or microfiche, provided that the use of such alternative media allows for expeditious inspection and review, and does not conflict with other applicable recordkeeping requirements

C.13 Actions Related to Noncompliance Demonstrated by a Stack Test [326 IAC 2-7-5][326 IAC 2-7-6]

(a) When the results of a stack test performed in conformance with Section C - Performance Testing, of this permit exceed the level specified in any condition of this permit, the Permittee shall submit a description of its response actions to IDEM, OAQ no later than seventy-five (75) days after the date of the test.

(b) A retest to demonstrate compliance shall be performed no later than one hundred eighty (180) days after the date of the test. Should the Permittee demonstrate to IDEM, OAQ that retesting in one hundred eighty (180) days is not practicable, IDEM, OAQ may extend the retesting deadline.

(c) IDEM, OAQ reserves the authority to take any actions allowed under law in response to noncompliant stack tests.

The response action documents submitted pursuant to this condition do require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

Record Keeping and Reporting Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

C.14 Emission Statement [326 IAC 2-7-5(3)(C)(iii)][326 IAC 2-7-5(7)][326 IAC 2-7-19(c)][326 IAC 2-6]

Pursuant to 326 IAC 2-6-3(a)(1), the Permittee shall submit by July 1 of each year an emission statement covering the previous calendar year. The emission statement shall contain, at a minimum, the information specified in 326 IAC 2-6-4(c) and shall meet the following requirements:

(1) Indicate estimated actual emissions of all pollutants listed in 326 IAC 2-6-4(a);

(2) Indicate estimated actual emissions of regulated pollutants as defined by 326 IAC 2-7-1(33) (“Regulated pollutant, which is used only for purposes of Section 19 of this rule”) from the source, for purpose of fee assessment.

The statement must be submitted to:

Indiana Department of Environmental Management
Technical Support and Modeling Section, Office of Air Quality
100 North Senate Avenue
MC 61-50 IGCN 1003
Indianapolis, Indiana 46204-2251

The emission statement does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

C.15 General Record Keeping Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-6] [326 IAC 2-2][326 IAC 2-3]

(a) Records of all required monitoring data, reports and support information required by this permit shall be retained for a period of at least five (5) years from the date of monitoring sample, measurement, report, or application. Support information includes the following, where applicable:
- (AA) All calibration and maintenance records.
- (BB) All original strip chart recordings for continuous monitoring instrumentation.
- (CC) Copies of all reports required by the Part 70 permit.

Records of required monitoring information include the following, where applicable:
- (AA) The date, place, as defined in this permit, and time of sampling or measurements.

(BB) The dates analyses were performed.
(CC) The company or entity that performed the analyses.
(DD) The analytical techniques or methods used.
(EE) The results of such analyses.
(FF) The operating conditions as existing at the time of sampling or measurement.

These records shall be physically present or electronically accessible at the source location for a minimum of three (3) years. The records may be stored elsewhere for the remaining two (2) years as long as they are available upon request. If the Commissioner makes a request for records to the Permittee, the Permittee shall furnish the records to the Commissioner within a reasonable time.

(b) Unless otherwise specified in this permit, for all record keeping requirements not already legally required, the Permittee shall be allowed up to ninety (90) days from the date of permit issuance or the date of initial start-up, whichever is later, to begin such record keeping.

(c) If there is a reasonable possibility (as defined in 326 IAC 2-2-8 (b)(6)(A), 326 IAC 2-2-8 (b)(6)(B), 326 IAC 2-3-2 (l)(6)(A), and/or 326 IAC 2-3-2 (l)(6)(B)) that a “project” (as defined in 326 IAC 2-2-1(oo) and/or 326 IAC 2-3-1(jj)) at an existing emissions unit, other than projects at a source with a Plantwide Applicability Limitation (PAL), which is not part of a “major modification” (as defined in 326 IAC 2-2-1(dd) and/or 326 IAC 2-3-1(y)) may result in significant emissions increase and the Permittee elects to utilize the “projected actual emissions” (as defined in 326 IAC 2-2-1(pp) and/or 326 IAC 2-3-1(kk)), the Permittee shall comply with following:

(1) Before beginning actual construction of the “project” (as defined in 326 IAC 2-2-1(oo) and/or 326 IAC 2-3-1(jj)) at an existing emissions unit, document and maintain the following records:

(A) A description of the project.

(B) Identification of any emissions unit whose emissions of a regulated new source review pollutant could be affected by the project.

(C) A description of the applicability test used to determine that the project is not a major modification for any regulated NSR pollutant, including:

(i) Baseline actual emissions;

(ii) Projected actual emissions;

(iii) Amount of emissions excluded under section 326 IAC 2-2-1(pp)(2)(A)(iii) and/or 326 IAC 2-3-1 (kk)(2)(A)(iii); and

(iv) An explanation for why the amount was excluded, and any netting calculations, if applicable.

(d) If there is a reasonable possibility (as defined in 326 IAC 2-2-8 (b)(6)(A) and/or 326 IAC 2-3-2 (l)(6)(A)) that a “project” (as defined in 326 IAC 2-2-1(oo) and/or 326 IAC 2-3-1(jj)) at an existing emissions unit, other than projects at a source with a Plantwide Applicability Limitation (PAL), which is not part of a “major modification” (as defined in 326 IAC 2-2-1(dd) and/or 326 IAC 2-3-1(y)) may result in significant emissions increase and the Permittee elects to utilize the “projected actual emissions” (as defined in 326 IAC 2-2-1(pp) and/or 326 IAC 2-3-1(kk)), the Permittee shall comply with following:

(1) Monitor the emissions of any regulated NSR pollutant that could increase as a result of the project and that is emitted by any existing emissions unit identified in (1)(B) above; and

(2) Calculate and maintain a record of the annual emissions, in tons per year on a calendar year basis, for a period of five (5) years following resumption of regular operations after the change, or for a period of ten (10) years following resumption of regular operations after the change if the project increases the design capacity of or the potential to emit that regulated NSR pollutant at the emissions unit.

C.16 General Reporting Requirements [326 IAC 2-7-5(3)(C)] [326 IAC 2-1.1-11] [326 IAC 2-2][326 IAC 2-3] [40 CFR 64][326 IAC 3-8]

(a) The Permittee shall submit the attached Quarterly Deviation and Compliance Monitoring Report or its equivalent. Proper notice submittal under Section B - Emergency Provisions satisfies the reporting requirements of this paragraph. Any deviation from permit requirements, the date(s) of each deviation, the cause of the deviation, and the response steps taken must be reported except that a deviation required to be reported pursuant to an applicable requirement that exists independent of this permit, shall be reported according to the schedule stated in the applicable requirement and does not need to be included in this report. This report shall be submitted not later than thirty (30) days after the end of the reporting period. The Quarterly Deviation and Compliance Monitoring Report shall include a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35). A deviation is an exceedance of a permit limitation or a failure to comply with a requirement of the permit.

On and after the date by which the Permittee must use monitoring that meets the requirements of 40 CFR Part 64 and 326 IAC 3-8, the Permittee shall submit CAM reports to the IDEM, OAQ.

A report for monitoring under 40 CFR Part 64 and 326 IAC 3-8 shall include, at a minimum, the information required under paragraph (a) of this condition and the following information, as applicable:

(1) Summary information on the number, duration and cause (including unknown cause, if applicable) of excursions or exceedances, as applicable, and the corrective actions taken;

(2) Summary information on the number, duration and cause (including unknown cause, if applicable) for monitor downtime incidents (other than downtime associated with zero and span or other daily calibration checks, if applicable); and

(3) A description of the actions taken to implement a QIP during the reporting period as specified in Section C-Response to Excursions or Exceedances. Upon completion of a QIP, the owner or operator shall include in the next summary report documentation that the implementation of the plan has been completed and reduced the likelihood of similar levels of excursions or exceedances occurring.

The Permittee may combine the Quarterly Deviation and Compliance Monitoring Report and a report pursuant to 40 CFR 64 and 326 IAC 3-8.

(b) The address for report submittal is:

Indiana Department of Environmental Management
Compliance and Enforcement Branch, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

(c) Unless otherwise specified in this permit, any notice, report, or other submission required by this permit shall be considered timely if the date postmarked on the envelope or certified mail receipt, or affixed by the shipper on the private shipping receipt, is on or before the date it is due. If the document is submitted by any other means, it shall be considered timely if received by IDEM, OAQ on or before the date it is due.

(d) Reporting periods are based on calendar years, unless otherwise specified in this permit. For the purpose of this permit “calendar year” means the twelve (12) month period from January 1 to December 31 inclusive.

(e) If the Permittee is required to comply with the recordkeeping provisions of (d) in Section C - General Record Keeping Requirements for any “project” (as defined in 326 IAC 2-2-1 (oo) and/or 326 IAC 2-3-1 (jj)) at an existing emissions unit, and the project meets the following criteria, then the Permittee shall submit a report to IDEM, OAQ:

(1) The annual emissions, in tons per year, from the project identified in (c)(1) in Section C- General Record Keeping Requirements exceed the baseline actual emissions, as documented and maintained under Section C- General Record Keeping Requirements (c)(1)(C)(i), by a significant amount, as defined in 326 IAC 2-2-1 (ww) and/or 326 IAC 2-3-1 (pp), for that regulated NSR pollutant, and

(2) The emissions differ from the preconstruction projection as documented and maintained under Section C - General Record Keeping Requirements (c)(1)(C)(ii).

(f) The report for project at an existing emissions *unit* shall be submitted no later than sixty (60) days after the end of the year and contain the following:

(1) The name, address, and telephone number of the major stationary source.

(2) The annual emissions calculated in accordance with (d)(1) and (2) in Section C - General Record Keeping Requirements.

(3) The emissions calculated under the actual-to-projected actual test stated in 326 IAC 2-2-2(d)(3) and/or 326 IAC 2-3-2(c)(3).

(4) Any other information that the Permittee wishes to include in this report such as an explanation as to why the emissions differ from the preconstruction projection.

Reports required in this part shall be submitted to:

Indiana Department of Environmental Management
Compliance and Enforcement Branch, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

(g) The Permittee shall make the information required to be documented and maintained in accordance with (c) in Section C- General Record Keeping Requirements available for review upon a request for inspection by IDEM, OAQ. The general public may request this information from the IDEM, OAQ under 326 IAC 17.1.

Stratospheric Ozone Protection

C.17 Compliance with 40 CFR 82 and 326 IAC 22-1

Pursuant to 40 CFR 82 (Protection of Stratospheric Ozone), Subpart F, except as provided for motor vehicle air conditioners in Subpart B, the Permittee shall comply with applicable standards for recycling and emissions reduction.

SECTION D.1 EMISSIONS UNIT OPERATION CONDITIONS

Emissions Unit Description:

(a) One (1) natural gas-fired #1 Starch Flash Dryer, identified as unit 40-4, with a maximum heat input capacity of 30 Million British Thermal Units per hour (MMBtu/hr) and with a maximum air throughput of 42,200 dscfm, using a wet scrubber for particulate control, constructed in 1965 and modified in 1994, and exhausting to stack 40-4.

(b) One (1) natural gas-fired #2 Starch Flash Dryer, identified as unit 40-3, with a maximum heat input capacity of 36 MMBtu/hr and with a maximum air throughput of 73,000 dscfm, using a wet scrubber for particulate control, constructed in 1967 and modified in 1994 and 1999, and exhausting to stack 40-3.

(c) One (1) natural gas-fired #3 Starch Flash Dryer, identified as unit 40-2, with a maximum heat input capacity of 36 MMBtu/hr and with a maximum air throughput of 60,000 dscfm, using a wet scrubber for particulate control, constructed in 1971, and exhausting to stack 40-2.

(d) One (1) natural gas-fired #4 Starch Flash Dryer, identified as unit 575-1, with a maximum heat input capacity of 43 MMBtu/hr and with a maximum air throughput of 84,100 dscfm, using a wet scrubber for particulate control, constructed in 1977, and exhausting to stack 575-1.

(e) One (1) natural gas-fired #5 Starch Flash Dryer, identified as unit 575-2, with a maximum heat input capacity of 38 MMBtu/hr and with a maximum air throughput of 84,200 dscfm, using a wet scrubber for particulate control, constructed in 1979 and replaced in 1995, and exhausting to stack 575-2.

(f) One (1) natural gas-fired #6 Starch Flash Dryer, identified as unit 575-3, with a maximum heat input capacity of 40 MMBtu/hr and with a maximum throughput of 84,100 dscfm, using a wet scrubber for particulate control, constructed in 1993, and exhausting to stack 575-3.

(g) One (1) natural gas-fired #1 Spray Dryer, identified as unit 5549-1, with a maximum heat input capacity of 25 MMBtu/hr and with a maximum air throughput of 26,000 dscfm, using a wet scrubber for particulate control, constructed in 1993 and modified in 1998, and exhausting to stack 5549-1.

(h) One (1) natural gas-fired #2 Spray Dryer, identified as unit 5549-2, with a maximum heat input capacity of 25 MMBtu/hr and with a maximum air throughput of 26,000 dscfm, using a wet scrubber for particulate control, constructed in 1993 and modified in 1998, and exhausting to stack 5549-2.

(i) One (1) natural gas-fired Feed Dryer, identified as unit 5502-1A, with a maximum heat input capacity of 77 MMBtu/hr and with a maximum throughput of 20 tons/hr, using a first effect wash water system for SO_2 control, and the RTO, unit 5502-1D for VOC, HAPs, and particulate control, constructed in 1997, and exhausting to the inlet of unit 5502-1D.

(j) One (1) natural gas-fired Germ Dryer, identified as unit 5502-1B, with a maximum heat input capacity of 20 MMBtu/hr and with a maximum throughput of 11 tons/hr, using the RTO, unit 5502-1D, for VOC, HAPs, and particulate control, constructed in 1997, and exhausting to the inlet of unit 5502-1D.

(k) One (1) natural gas-fired Gluten Dryer, identified as unit 5502-1C, with a maximum heat input capacity of 32 MMBtu/hr and with a maximum throughput of 4.21 tons/hr, using the RTO, unit 5502-1D, for VOC, HAPs, and particulate control, constructed in 1997, and exhausting to the inlet of unit 5502-1D.

(l) One (1) natural gas-fired Regenerative Thermal Oxidizer (RTO), identified as unit 5502-1D, with a maximum heat input capacity of 18 MMBtu/hr, used as a control for VOC, HAPs, and particulate, with a maximum air throughput of 45,148 dscfm, constructed in 1997, and exhausting to stack 5502-7.

(m) Spray Agglomerator #3, identified as unit 5549-28, part of the spray agglomeration process, with a maximum heat input capacity of 25.0 MMBtu/hr and with a maximum air throughput of 38,000 dscfm, using a wet scrubber for particulate control, constructed in 2001, and exhausting to stack 5549-28.

*The control device is considered both integral to the process and inherent to the process for CAM applicability. Inherent process equipment is not subject to Compliance Assurance Monitoring (CAM).

**The control device is considered inherent to the process for CAM applicability. Inherent process equipment is not subject to Compliance Assurance Monitoring (CAM).

(The information describing the process contained in this emissions unit description box is descriptive information and does not constitute enforceable conditions.)

Emission Limitations and Standards [326 IAC 2-7-5(1)]

D.1.1 Prevention of Significant Deterioration (PSD) Minor Limits [326 IAC 2-2]

(a) PM and PM10

(1) Pursuant to SPM No. 097-34377-00042, issued on January 22, 2015, the combined input of starch for units 5549-1 and 5549-2 shall not exceed 30,000 tons per twelve (12) consecutive month period, with compliance determined at the end of each month, and the total emission rate shall not exceed 2.50 pound PM per ton of starch and 2.50 pound of PM10 per ton of starch.

Compliance with these limits, in combination with other limits, will limit the net emissions increase of the 1993 Modification (CP 097-00042-93-01) and the 1997 Modification (CP 097-00042-97-01) each to less than twenty-five (25) tons of PM and fifteen (15) tons of PM10 per twelve (12) consecutive month period and shall render the requirements of 326 IAC 2-3 (Emission Offset) and 326 IAC 2-2 (Prevention of Significant Deterioration) not applicable to the 1993 and 1997 Modifications.

(2) Pursuant to T097-34650-00042, PM and PM10 emissions from 575-3 shall not exceed the limits in the table below:

Unit (Stack)	PM Limits			PM10 Limits		
	(gr/dscf)	(lb/hr)	(ton/yr)	(gr/dscf)	(lb/hr)	(ton/yr)
575-3 (575-3)	0.012	7.82	34.25	0.012	6.253	27.39

Compliance with these limits, in combination with other limits, will limit the net emissions increase of the 1993 Modification (CP 097-00042-93-01) and 1997 Modification (CP 097-00042-97-01) each to less than twenty-five (25) tons of PM and fifteen (15) tons of PM10 per twelve (12) consecutive month period and shall render the requirements of 326 IAC 2-3 (Emission Offset) and 326 IAC 2-2 (Prevention of Significant Deterioration not applicable to the 1993 and 1997 Modifications.

(3) Pursuant to T097-34650-00042, PM and PM10 emissions from 5549-28 shall not exceed the limits in the table below:

Unit (Stack)	PM Limits			PM10 Limits		
	(gr/dscf)	(lb/hr)	(ton/yr)	(gr/dscf)	(lb/hr)	(ton/yr)
5549-28 (5549-28)	0.025	8.14	35.67	0.025	8.14	35.67

Compliance with these limits, in combination with other limits, will limit the net emissions increase of the 2000 Modification (SSM No. 097-11362-00042) to less than twenty-five (25) tons of PM and fifteen (15) tons of PM10 per twelve (12) consecutive month period and shall render the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) not applicable to the 2000 Modification.

(4) Pursuant to SPM No. 097-34377-00042, issued on January 22, 2015, PM and PM10 emissions from units 5502-1A, 5502-1B, 5502-1C, and 5502-1D shall not exceed the limits in the table below:

Unit (Stack)	PM Limits			PM10 Limits		
	(gr/dscf)	(lb/hr)	(ton/yr)	(gr/dscf)	(lb/hr)	(ton/yr)
5502-1A (5502-7)	0.0114	4.533	19.855	0.0114	4.533	19.855
5502-1B (5502-7)						
5502-1C (5502-7)						
5502-1D (5502-7)						

Compliance with these limits, in combination with other limits, will limit the net emissions increase of the 1997 Modification (CP 097-00042-97-01), the 1999 Modification (CP 097-00042-99-01), and the 2000 Modification (SSM No. 097-11362-00042) each to less than twenty-five (25) tons of PM and fifteen (15) tons of PM10 per twelve (12) consecutive month period. These limits shall render the requirements of 326 IAC 2-3 (Emission Offset) and 326 IAC 2-2 (Prevention of Significant Deterioration not applicable to the 1997 Modification. These limits shall render the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) not applicable to the 1999 and 2000 Modifications.

(5) Pursuant to T097-34650-00042, the starch produced from unit 40-3 shall not exceed 127,000 tons per twelve (12) consecutive month period, with compliance determined at the end of each month, and the emission rate shall not exceed 0.566 pound of PM per ton of starch produced and 0.566 pound of PM10 per ton of starch produced. Compliance with these limits, in combination with other limits, will limit the net emissions increase of the 1999 Modification (CP 097-00042-99-01) and the 2000 Modification (SSM No. 097-11362-00042) each to less than twenty-five (25) tons of PM and fifteen (15) tons of PM10 per twelve (12) consecutive month period and shall render the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) not applicable to the 1999 and 2000 Modifications.

(b) SO2
Pursuant to CP 097-00042-97-01, issued on March 24, 1997, the SO_2 emissions from units 5502-1A, 5502-1B, 5502-1C, and 5502-1D shall not exceed a total of 8.05 pounds per hour.

Compliance with this limit will limit the potential to emit of the 1997 Modification (CP 097-00042-97-01) to less than forty (40) tons of SO_2 per twelve (12) consecutive month period and shall render the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) not applicable to the 1997 Modification.

(c) NOx
Pursuant to T097-34650-00042:

(1) The combined input of natural gas to units 5502-1A, 5502-1B, 5502-1C, and 5502-1D shall not exceed 1,263 million cubic feet (MMcf) per twelve (12) consecutive month period, with compliance determined at the end of each month.

(2) NOx emissions from units 5502-1A, 5502-1B, 5502-1C, and 5502-1D shall not exceed 62.0 pounds per MMcf.

Compliance with these limits will limit the potential to emit of the 1997 Modification (CP 097-00042-97-01) to less than forty (40) tons of NO_x per twelve (12) consecutive month period and shall render the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) not applicable to the 1997 Modification.

(d) VOC
Pursuant SSM No. 097-24401-00042, issued on October 28, 2008, the combined VOC emissions from units 5502-1A, 5502-1B, 5502-1C, and 5502-1D shall not exceed a total of 4.89 pounds per hour.

Compliance with this limit will limit the potential to emit of the Germ Dryer, Feed Dryer, and Gluten Dryer to less than forty (40) tons of VOC per twelve (12) consecutive month period and shall render the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) not applicable to the Germ Dryer, Feed Dryer, and Gluten Dryer.

D.1.2 HAP Area Source Limits [326 IAC 2-4.1]

In order to render the requirements of 326 IAC 2-4.1 (Major Sources of Hazardous Air Pollutants) not applicable and to render the source minor under Section 112 of the Clean Air Act, the Permittee shall comply with the following limits:

(a) Acetaldehyde HAP emissions from the Germ Dryer, Feed Dryer, Gluten Dryer, and RTO, identified as 5502-1A, 5502-1B, 5502-1C, and 5502-1D, combined shall not exceed 2.24 pounds per hour (lbs/hr).

(b) The combined HAP emissions (acetaldehyde, acrolein, formaldehyde, and methanol) from the Germ Dryer, Feed Dryer, Gluten Dryer, and RTO, identified as 5502-1A, 5502-1B, 5502-1C, and 5502-1D, shall not exceed 2.65 pounds per hour (lbs/hr).

Compliance with these limits, in combination with the potential to emit of any single HAP and any combination of HAPs from all other emission units at the source shall limit the source-wide potential to emit of any single HAP to less than ten (10) tons per twelve (12) consecutive month period and the potential to emit of any combination of HAPs to less than twenty-five (25) tons per twelve (12) consecutive month period, and shall render the requirements 326 IAC 2-4.1 (Major Sources of Hazardous Air Pollutants) not applicable and shall render the source minor under Section 112 of the Clean Air Act.

D.1.3 Particulate Matter [326 IAC 6.5-1-2]

Pursuant to 326 IAC 6.5-1-2(a), particulate matter emissions from units 575-3, 5502-1A, 5502-1B, 5502-1C, 5502-1D, 5549-1, 5549-2, and 5549-28 shall each not exceed 0.03 grain per dry standard cubic foot (gr/dscf).

D.1.4 Particulate Matter [326 IAC 6.5-6-25]

(a) Pursuant to 326 IAC 6.5-6-25(a), units 40-4, 40-3, 40-2, 575-1, and 575-2 shall meet the emission limits as indicated in the table below:

Unit	PM Limit (gr/dscf)	PM Limit (ton/yr)
40-4	0.020	44.1
40-3	0.020	42.3
40-2	0.020	31.9
575-1	0.018	32.4
575-2	0.011	32.4

(b) Pursuant to 326 IAC 6.5-6-25(b), units 40-4, 40-3, 40-2, 575-1, and 575-2 shall burn only natural gas.

D.1.5 Volatile Organic Compounds [326 IAC 8-1-6]

Pursuant to SSM No. 097-24401-00042, issued on October 28, 2008 and 326 IAC 8-1-6, the Permittee shall employ Best Available Control Technology (BACT) for emission units 5502-1A, 5502-1B, 5502-1C which has been determined to be:

(a) The VOC emissions from the Germ Dryer, Feed Dryer, and Gluten Dryer, identified as 5502-1A, 5502-1B, and 5502-1C, shall be controlled by a regenerative thermal oxidizer or an equivalent thermal oxidation unit*.

(b) The overall VOC efficiency for the regenerative thermal oxidizer, or an equivalent thermal oxidation unit*, (including capture efficiency and destruction efficiency) shall be at least 95%.

(c) The VOC emissions from the Germ Dryer, Feed Dryer, and Gluten Dryer, identified as 5502-1A, 5502-1B, and 5502-1C, combined shall not exceed 4.89 pounds per hour (lbs/hr).

**An equivalent thermal oxidation* unit means a unit that can meet the same level of control or better than 5502-1D, that results in a potential to emit for each regulated pollutant that is less than or equal to the potential to emit of 5502-1D, and that would not result in the need for a modification pursuant to 326 IAC 2-7-10.5, 326 IAC 2-2, 326 IAC 2-3, 326 IAC 2-1.1-5, or 326 IAC 2-4.1.

D.1.6 Preventive Maintenance Plan [326 IAC 2-7-5(12)]

A Preventive Maintenance Plan is required for these units and their control devices. Section B - Preventive Maintenance Plan contains the Permittee's obligation with regard to the preventive maintenance plan required by this condition.

Compliance Determination Requirements [326 IAC 2-7-5(1)]

D.1.7 Particulate, Sulfur Dioxide, HAPs, and VOC Control

(a) In order to assure compliance with Conditions D.1.1(a)(4), D.1.1(d), D.1.2, D.1.3, and D.1.5, the RTO, 5502-1D, or an equivalent thermal oxidation unit, shall be in operation and control particulate and VOC emissions from units 5502-1A, 5502-1B, and 5502-1C at all times when any of those units are in operation.

(b) In order to assure compliance with Condition D.1.1(b), the first effect wash water system shall be in operation and control SO_2 emissions from unit 5502-1A at all times the unit is in operation.

(c) In order to assure compliance with Conditions D.1.1, D.1.3, and D.1.4, the scrubbers shall be in operation and control particulate emissions from units 40-2, 40-3, 40-4, 575-1, 575-2, 575-3, 5549-1, 5549-2, and 5549-28 at all times those units are in operation.

D.1.8 Testing Requirements [326 IAC 2-1.1-11]

(a) In order to demonstrate compliance with Conditions D.1.1(b), D.1.1(d), and D.1.5, the Permittee shall perform SO_2 and VOC testing on emission units 5502-1A, 5502-1B, 5502-1C and 5502-1D, utilizing methods as approved by the Commissioner at least once every five (5) years from the date of the most recent valid compliance demonstration. Testing shall be conducted in accordance with the provisions of 326 IAC 3-6 (Source Sampling Procedures). Section C - Performance Testing contains the Permittee's obligation with regard to the performance testing required by this condition.

(b) If emission unit 5502-1D is replaced with an equivalent thermal oxidation unit, not later than 180 days after installation of an equivalent thermal oxidation unit, in order to demonstrate compliance with Conditions D.1.1(d) and D.1.5, the Permittee shall perform VOC testing on emission units 5502-1A, 5502-1B, 5502-1C, utilizing methods approved by the Commissioner at least once every five (5) years from the date of the most recent valid compliance demonstration of an equivalent thermal oxidation unit. Testing shall be conducted in accordance with the provisions of 326 IAC 3-6 (Source Sampling Procedures). Section C - Performance Testing contains the Permittee's obligation with regard to the performance testing required by this condition.

(c) In order to demonstrate compliance with Condition D.1.2, the Permittee shall perform acetaldehyde and combined HAP (acetaldehyde, acrolein, methanol, and formaldehyde) testing on emission units 5502-1A, 5502-1B, 5502-1C and 5502-1D, utilizing methods as approved by the Commissioner at least once every five (5) years from the date of the most recent valid compliance demonstration. Testing shall be conducted in accordance with the provisions of 326 IAC 3-6 (Source Sampling Procedures). Section C - Performance Testing contains the Permittee's obligation with regard to the performance testing required by this condition.

Compliance Monitoring Requirements [326 IAC 2-7-5(1)][326 IAC 2-7-6(1)]

D.1.9 Visible Emission Notations [40 CFR 64]

(a) Visible emission notations of exhaust from stacks 40-2, 40-3, 40-4, 575-1, 575-2, 575-3, 5502-7, 5549-1, 5549-2, and 5549-28 shall be performed once per day during normal daylight operations. A trained employee shall record whether emissions are normal or abnormal.

(b) For processes operated continuously, "normal" means those conditions prevailing, or expected to prevail, eighty percent (80%) of the time the process is in operation, not counting startup or shut down time.

(c) In the case of batch or discontinuous operations, readings shall be taken during that part of the operation that would normally be expected to cause the greatest emissions.

(d) A trained employee is an employee who has worked at the plant at least one (1) month and has been trained in the appearance and characteristics of normal visible emissions for that specific process.

(e) If abnormal emissions are observed, the Permittee shall take a reasonable response. Section C - Response to Excursions or Exceedances contains the Permittee's obligation with regard to the reasonable response steps required by this condition. A notation of abnormal emissions is not a deviation from the permit. Failure to take response steps shall be considered a deviation from this permit.

D.1.10 Parametric Monitoring for First Effect Water Wash System

The Permittee shall monitor and record the pH and flow rate of the liquid through the nozzles of the first effect wash water to the GHE at least once per week of the system used to control SO2 emissions from unit 5502-1A.

(a) pH
When for any one reading, the pH of the first effect wash water is outside the normal range, the Permittee shall take a reasonable response. The Permittee shall maintain a pH at or above the minimum pH observed during the latest stack test. Section C - Response to Excursions or Exceedances contains the Permittee's obligation with regard to the response steps required by this condition. A pH reading that is outside the above mentioned range is not a deviation from this permit. Failure to take response steps shall be considered a deviation from this permit.

The instruments used for determining the pH shall comply with Section C – Instrument Specifications, of this permit, shall be subject to approval by IDEM, OAQ, and shall be calibrated or replaced at least once every six (6) months.

(b) Flow Rate
(1) The Permittee shall monitor and record the flow rate of the system used to control SO2 emissions from unit 5502-1A at least once per week when the associated processes are in operation.

(2) The Permittee shall determine the minimum flow rate from the latest valid stack test that demonstrates compliance with limits in Condition D.1.1(b).

(3) On and after the date the stack test results are available, the Permittee shall maintain a flow rate at or above the minimum rate as observed during the latest compliant stack test.

(4) When for any one reading, the flow rate is below the above mentioned minimum, the Permittee shall take a reasonable response. Section C - Response to Excursions or Exceedances contains the Permittee's obligation with regard to the reasonable response steps required by this condition. A reading that is below the above mentioned minimum flow rate is not a deviation from this permit. Failure to take response steps shall be considered a deviation from this permit.

D.1.11 Parametric Monitoring for Scrubbers [40 CFR 64]

(a) The Permittee shall monitor and record the exhaust air stream pressure drop and scrubber make-up rate across each scrubber, controlling emissions from units 40-2, 40-3, 40-4, 575-1, 575-2, 575-3, 5549-1, and 5549-2, at least once per week when the associated processes are in operation.

(b) The Permittee shall monitor and record the exhaust air stream pressure drop and scrubber make-up rate across the scrubber controlling emissions from unit 5549-28 at least once per day when the associated process is in operation.

(c) Exhaust Air Stream Pressure Drop
When for any one reading, an exhaust air stream pressure drop is outside the normal range, the Permittee shall take a reasonable response. The normal ranges for these units are indicated in the table below, unless a different upper-bound or lower-bound value for these ranges is determined during the latest stack test. Section C - Response to Excursions or Exceedances contains the Permittee's obligation with regard to the response steps required by this condition. An exhaust air stream pressure drop that is

outside the above mentioned ranges is not a deviation from this permit. Failure to take response steps shall be considered a deviation from this permit.

Unit ID	Stack ID	Normal Pressure Drop Range (inches of water)
40-2	40-2	3.0 - 8.0
40-3	40-3	6.0 - 15.0
40-4	40-4	3.0 - 8.0
575-1	575-1	6.0 - 15.0
575-2	575-2	6.0 - 15.0
575-3	575-3	6.0 - 15.0
5549-1	5549-1	6.0 - 15.0
5549-2	5549-2	6.0 - 15.0
5549-28	5549-28	6.0 - 15.0

(d) Scrubber Make-Up Rate
When for any one reading, a scrubber make-up rate is outside the normal range, the Permittee shall take a reasonable response. The normal ranges for these units are indicated in the table below, unless a different lower-bound value for these ranges is determined during the latest stack test. Section C - Response to Excursions or Exceedances contains the Permittee's obligation with regard to the response steps required by this condition. A scrubber make-up rate that is outside the above mentioned ranges is not a deviation from this permit. Failure to take response steps shall be considered a deviation from this permit.

Unit ID	Stack ID	Normal Scrubber Make-Up Rate (gal/min)
40-2	40-2	≥ 10
40-3	40-3	≥ 10
40-4	40-4	≥ 10
575-1	575-1	≥ 10
575-2	575-2	≥ 10
575-3	575-3	≥ 10
5549-1	5549-1	≥ 20
5549-2	5549-2	≥ 20
5549-28	5549-28	≥ 20

(e) The instruments used for determining the pressure drop shall comply with Section C - Instrument Specifications, of this permit, shall be subject to approval by IDEM, OAQ, and shall be calibrated or replaced at least once every six (6) months.

D.1.12 Scrubber or Water Wash System Failure Detection

In the event that a scrubber or water wash system malfunction has been observed:

(a) For a scrubber or water wash system controlling emissions from a process operated continuously, a failed unit and the associated process will be shut down immediately until the failed unit has have been repaired or replaced. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of this permit (Section B - Emergency Provisions).

(b) For a scrubber or waterwash system controlling emissions from a batch process, the feed to the process shall be shut down immediately until the failed unit has been repaired or replaced. The emissions unit shall be shut down no later than the completion of the processing of the material in the line. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of this permit (Section B - Emergency Provisions).

D.1.13 RTO Temperature [40 CFR 64]

(a) A continuous monitoring system shall be calibrated, maintained, and operated on the RTO 5502-1D, or an equivalent thermal oxidation unit, for measuring operating temperature. For the purpose of this condition, continuous means no less often than once per fifteen (15) minutes. The output of this system shall be recorded as a 3-hour average.

(b) The Permittee shall determine the 3-hour average temperature from the latest valid stack test that demonstrates compliance with the limits in Conditions D.1.1(d), D.1.2, and D.1.5.

(c) On and after the date the stack test results are available, the Permittee shall operate the thermal oxidizer at or above the 3-hour average temperature as observed during the latest compliant stack test.

(d) If the 3-hour average temperature falls below the above mentioned 3-hour average temperature, the Permittee shall take a reasonable response. Section C - Response to Excursions or Exceedances contains the Permittee's obligation with regard to the response steps required by this condition. A 3-hour average temperature reading below the above mentioned 3-hour average temperature is not a deviation from this permit. Failure to take response steps shall be considered a deviation from this permit.

D.1.14 Parametric Monitoring - RTO Fan Amperage [40 CFR 64]

(a) The Permittee shall determine the appropriate fan amperage from the latest valid stack test that demonstrates compliance with limits in Conditions D.1.1(a)(4), D.1.1(d), and D.1.2.

(b) The duct pressure or fan amperage shall be observed at least once per day when the thermal oxidizer is in operation. On and after the date the stack test results are available, the duct pressure or fan amperage shall be maintained within the normal range as established in latest compliant stack test.

(c) When, for any one reading, the duct pressure or fan amperage is outside the above mentioned range, the Permittee shall take a reasonable response. Section C - Response to Excursions and Exceedances contains the Permittee's obligation with regard to the reasonable response steps required by this condition. A reading that is outside the above mentioned range is not a deviation from this permit. Failure to take response steps shall be considered a deviation from this permit.

Record Keeping and Reporting Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

D.1.15 Record Keeping Requirements

(a) To document the compliance status with Condition D.1.1(a)(1), the Permittee shall maintain monthly records of the combined input of starch for units 5549-1 and 5549-2.

(b) To document the compliance status with Condition D.1.1(a)(5), the Permittee shall maintain monthly records of the amount of starch produced by unit 40-3.

(c) To document the compliance status with Condition D.1.1(c), the Permittee shall maintain monthly records of the total input of natural gas consumed by units 5502-1A, 5502-1B, 5502-1C, and 5502-1D.

(d) To document the compliance status with Condition D.1.9, the Permittee shall maintain records of the daily visible emission notations of the exhaust from stacks 40-2, 40-3, 40-4, 575-1, 575-2, 575-3, 5502-7, 5549-1, 5549-2, and 5549-28. The Permittee shall include in its daily record when a visible emission notation is not taken and the reason for the lack of visible emission notation (e.g. the process did not operate that day).

(e) To document the compliance status with Condition D.1.10, the Permittee shall maintain records of the weekly pH and flow rate readings of the first (1st) effect wash water system for unit 5502-1A. The Permittee shall include in its weekly record when a reading is not taken and the reason for the lack of reading (e.g. the process did not operate that week).

(f) To document the compliance status with Condition D.1.11, the Permittee shall maintain records of the weekly pressure drop readings and make-up rates for the scrubbers associated with units 40-2, 40-3, 40-4, 575-1, 575-2, 575-3, 5549-1, and 5549-2. The Permittee shall include in its weekly record when a reading is not taken and the reason for the lack of a reading (e.g. the process did not operate that week).

(g) To document the compliance status with Condition D.1.11(b), the Permittee shall maintain records of the daily pressure drop readings and make-up rates for the scrubber associated with unit 5549-28. The Permittee shall include in its daily record when a reading is not taken and the reason for the lack of reading (e.g. the process did not operate that day).

(h) To document the compliance status with Condition D.1.13, the Permittee shall maintain continuous temperature records for the RTO (unit 5502-1D), or an equivalent thermal oxidation unit, and the 3-hour average temperature used to demonstrate compliance during the most recent compliant stack test.

(i) To document the compliance status with Condition D.1.14, the Permittee shall maintain records of the daily duct pressure or fan amperature readings for the RTO (unit 5502-1D). The Permittee shall include in its daily record when the readings are not taken and the reason for the lack of readings (e.g. the process did not operate that day).

(j) Section C - General Record Keeping Requirements contains the Permittee's obligation with regard to the records required by this condition.

D.1.16 Reporting Requirements

Quarterly summaries of the information to document the compliance status with Conditions D.1.1(a)(1), D.1.1(a)(5), and D.1.1(c) shall be submitted not later than thirty (30) days after the end of the quarter being reported. Section C - General Reporting contains the Permittee's obligation with regard to the reporting required by this condition. The reports submitted by the Permittee do require a certification that meets the requirements of 326 IAC 2-7-6(1) by a “responsible official,” as defined by 326 IAC 2-7-1(35).

SECTION D.2 EMISSIONS UNIT OPERATION CONDITIONS

Emissions Unit Description:

(n) One (1) Product Storage Hopper, identified as unit 5552-1, with a maximum air throughput of 2,450 dscfm, using a baghouse* for particulate control, constructed in 1995, and exhausting to stack 5552-1.

(o) One (1) Product Transfer Hopper, identified as unit 5552-2, with a maximum air throughput of 350 dscfm, using a baghouse* for control, constructed in 1995, and exhausting to stack 5552-2.

(p) One (1) Germ Bin, one (1) Pellet Bin #1, and one (1) Pellet Bin #2, identified as units 5503-2, 5503-3, and 5503-4 respectively, and with a combined maximum throughput of 120 tons/hr, with a maximum air throughput of 8,640 dscfm, using a Loadout Dust Collection System for particulate control, identified as 5503-5, each constructed in 1997, and exhausting to stack 5503-2.

(q) One (1) DSW Packing Fugitive Dust Collector, identified as unit 71-7, with a maximum throughput of 0.1 tons/hr, with a maximum air throughput of 9,000 dscfm, using a baghouse for particulate control, constructed in 1977, and exhausting to stack 71-7.

(r) One (1) RSP North Packing Line, identified as unit 577-2, with a maximum throughput of 18 tons/hr, with a maximum air throughput of 9,600 dscfm, using a baghouse* for particulate control, constructed in 1979 and modified in 2000, and exhausting to stack 577-2.

(s) One (1) Gluten Receiver, identified as unit 5503-1, with a maximum throughput of 4.21 tons/hr, with a maximum air throughput of 18,580 dscfm, using a baghouse* for particulate control, constructed in 1997, and exhausting to stack 5503-1.

(t) One (1) Pellet Cooler and one (1) Germ Cooler, identified as units 5502-5 and 5502-6, with a maximum throughput of 19.36 tons/hr and 4.21 tons/hr respectively, with maximum air throughputs of 13,790 dscfm and 12,080 dscfm respectively, each using a high efficiency cyclone for particulate control, each constructed in 1997, and exhausting to stacks 5502-5 and 5502-6.

(u) Two (2) Loose Feed Bins, collectively identified as unit 5502-4, each with a maximum throughput of 19.36 tons/hr, using a baghouse for particulate control, constructed in 1997, and exhausting to stack 5502-3.

(v) One (1) Feed Dust Collector, identified as unit 5502-3, with a maximum throughput of 19.36 tons/hr, with a maximum air throughput of 11,700 dscfm, using a baghouse for particulate control, constructed in 1997, and exhausting to stack 5502-3.

(w) One (1) DSE Bag Slitter, identified as unit 42-10, with a maximum throughput of 10 tons/hr, with a maximum air throughput of 5,000 dscfm, using a baghouse for particulate control, constructed in 1987, and exhausting to stack 42-10.

(x) One (1) RSP Hopper #4, identified as unit 577-5, with a maximum air throughput of 4,500 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 577-5.

(y) One (1) RSP Hopper #6, identified as unit 577-6, with a maximum air throughput of 4,500 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 577-6.

(z) One (1) RSP Hopper #5, identified as unit 577-7, with a maximum air throughput of 4,500 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 577-7.

(aa) One (1) RSP Hopper #1, identified as unit 577-8, with a maximum air throughput of 4,500 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 577-8.

(bb) One (1) RSP Hopper #2, identified as unit 577-9, with a maximum air throughput of 4,500 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 577-9.

(cc) One (1) RSP Hopper #3, identified as unit 577-10, with a maximum air throughput of 4,500 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 577-10.

(dd) One (1) Industrial Packer, identified as unit 71-1, with a maximum air throughput of 5,300 dscfm, using a baghouse for particulate control, constructed in 1994, and exhausting to stack 71-1.

(ee) Two (2) Spray Dryer Product Receivers, identified as units 5549-3 and 5549-4, each with a maximum air throughput of 1,700 dscfm, each using a baghouse* for particulate control, constructed in 1993 and 1996, and exhausting to stacks 5549-3 and 5549-4.

(ff) One (1) Spray Dryer Storage Hopper #1, identified as unit 5549-7, with a maximum air throughput of 450 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 5549-7.

(gg) One (1) Spray Dryer Storage Hopper #2, identified as unit 5549-8, with a maximum air throughput of 450 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 5549-8.

(hh) One (1) #2 Spray Dryer Storage Hopper #3, identified as unit 5549-9, with a maximum air throughput of 450 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 5549-9.

(ii) One (1) #2 Spray Dryer Storage Hopper #4, identified as unit 5549-10, with a maximum air throughput of 450 dscfm, using a baghouse* for particulate control, constructed in 1993, and exhausting to stack 5549-10.

(jj) One (1) Agglomerator Feed Storage Bin, identified as unit 5549-12, with a maximum air throughput of 1,530 dscfm, using a baghouse* for particulate control, constructed in 1995, and exhausting to stack 5549-12.

(kk) One (1) Agglomerator, identified as unit 5549-13, with a maximum air throughput of 12,500 dscfm, using a baghouse for particulate control, constructed in 1995, including one (1) natural gas-fired burner with a maximum heat input capacity of 1.824 MMBtu/hr, and exhausting to stack 5549-13.

(ll) One (1) Agglomerator Equipment Aspiration, identified as unit 5549-14, with a maximum air throughput of 2,840 dscfm, using a baghouse** for particulate control, constructed in 1995, and exhausting to stack 5549-14.

(mm) One (1) spray agglomeration process, constructed in 2000, consisting of the following units:

(1) Bulk Bag Packer Filter Receiver, identified as unit 5549-17, with a maximum air throughput of 450 dscfm, using a baghouse* for particulate control, and exhausting to stack 5549-17.

(2) Line 1 Middle Packer, identified as unit 5549-18, with a maximum air throughput of 4,600 dscfm, using a baghouse* for particulate control, and exhausting to stack 5549-18.

(3) Line 1 North Packer, identified as unit 5549-19, with a maximum air throughput of 5,400 dscfm, using a baghouse* for particulate control, and exhausting to stack 5549-19.

(4) #2 Fugitive Dust Collector, identified as emission unit 5549-20, with a maximum throughput of 14,000 dscfm, using a baghouse for particulate control, and exhausting to stack 5549-20.

(5) Line 1 Fugitive Dust Collector, identified as unit 5549-21, with a maximum air throughput of 14,000 dscfm, using a baghouse for particulate control, and exhausting to stack 5549-21.

(6) Line 2 Receiver, identified as unit 5549-26, with a maximum air throughput of 5,400 dscfm, using a baghouse* for particulate control, and exhausting to stack 5549-26.

(nn) One (1) Corn Truck Dump, identified as unit 56-1, with a maximum throughput of 448 tons/hr, with a maximum air throughput of 35,000 dscfm, using a baghouse for particulate control, constructed prior to 1968 and modified in 1996, and exhausting to stack 56-1.

*The control device is considered both integral to the process and inherent to the process for CAM applicability. Inherent process equipment is not subject to Compliance Assurance Monitoring (CAM).

**The control device is considered inherent to the process for CAM applicability. Inherent process equipment is not subject to Compliance Assurance Monitoring (CAM).

(The information describing the process contained in this emissions unit description box is descriptive information and does not constitute enforceable conditions.)

Emission Limitations and Standards [326 IAC 2-7-5(1)]

D.2.1 Prevention of Significant Deterioration (PSD) and Emission Offset Minor Limits [326 IAC 2-2][326 IAC 2-3]

(a) In order to render the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) and 326 IAC 2-3 (Emission Offset) not applicable to the 1993 Modification (CP 097-00042-93-01, issued on May 10, 1993) and the 1997 Modification (CP097-00042-97-01, issued on March 24, 1997), the Permittee shall comply with the following:

(1) Pursuant to CP 097-00042-97-01, issued on March 24, 1997, PM and PM10 emissions shall not exceed the limits in the table below:

Unit (Stack)	PM Limits			PM10 Limits		
	(gr/dscf)	(lb/hr)	(ton/yr)	(gr/dscf)	(lb/hr)	(ton/yr)
5549-3 (5549-3)	0.01	0.146	0.64	0.01	0.146	0.64
5549-7 (5549-7)	0.01	0.039	0.17	0.01	0.039	0.17
5549-8 (5549-8)	0.01	0.039	0.17	0.01	0.039	0.17
5549-9 (5549-9)	0.01	0.039	0.17	0.01	0.039	0.17
5549-10 (5549-10)	0.01	0.039	0.17	0.01	0.039	0.17

(2) Pursuant to T097-34650-00042, PM and PM10 emissions shall not exceed the limits in the table below:

Unit (Stack)	PM Limits			PM10 Limits		
	(gr/dscf)	(lb/hr)	(ton/yr)	(gr/dscf)	(lb/hr)	(ton/yr)
577-5 (577-5)	0.01	0.386	1.69	0.01	0.386	1.69
577-6 (577-6)	0.01	0.386	1.69	0.01	0.386	1.69
577-7 (577-7)	0.01	0.386	1.69	0.01	0.386	1.69
577-8 (577-8)	0.01	0.386	1.69	0.01	0.386	1.69
577-9 (577-9)	0.01	0.386	1.69	0.01	0.386	1.69
577-10 (577-10)	0.01	0.386	1.69	0.01	0.386	1.69

Compliance with these limits, in combination with other limits, will limit the net emissions increase of the 1993 Modification (CP 097-00042-93-01) and 1997 Modification (CP 097-00042-97-01) each to less than twenty-five (25) tons of PM and fifteen (15) tons of PM10 per twelve (12) consecutive month period and shall render the requirements of 326 IAC 2-3 (Emission Offset) and 326 IAC 2-2 (Prevention of Significant Deterioration not applicable to the 1993 and 1997 Modifications.

(b) In order to render the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) and 326 IAC 2-3 (Emission Offset) not applicable to the 1997 Modification (CP 097-00042-97-01, issued on March 24, 1997) and in order to render the requirements of 326 IAC 2-2 not applicable to the 1999 Modification (CP 097-00042-99-01, issued on February 25, 1999) and the 2000 Modification (SSM No. 097-11362-00042, issued on August 30, 2000), the Permittee shall comply with the following:

(1) Pursuant to CP 097-00042-97-01, issued on March 24, 1997, PM and PM10 emissions shall not exceed the limits in the table below:

Unit (Stack)	PM Limits			PM10 Limits		
	(gr/dscf)	(lb/hr)	(ton/yr)	(gr/dscf)	(lb/hr)	(ton/yr)
5549-4 (5549-4)	0.01	0.146	0.64	0.01	0.146	0.64
5549-12 (5549-12)	0.01	0.13	0.57	0.01	0.13	0.57
5549-14 (5549-14)	0.01	0.244	1.07	0.01	0.244	1.07

(2) Pursuant to CP 097-00042-97-01, issued on March 24, 1997, the input of starch to unit 5549-13 shall not exceed 14,010 tons per twelve (12) consecutive month period, with compliance determined at the end of each month, and the emission rate shall not exceed 0.61 pound of PM per ton of starch and 0.61 pound of PM10 per ton of starch.

(3) Pursuant to SPM No. 097-24287-00042, issued on August 23, 2007, PM and PM10 emissions shall not exceed the limits in the table below:

Unit (Stack)	PM Limits			PM10 Limits		
	(gr/dscf)	(lb/hr)	(ton/yr)	(gr/dscf)	(lb/hr)	(ton/yr)
5502-5 (5502-5)	0.01	1.182	5.177	0.01	1.182	5.177

Unit (Stack)	PM Limits			PM10 Limits		
	(gr/dscf)	(lb/hr)	(ton/yr)	(gr/dscf)	(lb/hr)	(ton/yr)
5503-1 (5503-1)	0.01	1.593	6.977	0.01	1.593	6.977

(4) Pursuant to SPM No. 097-23497-00042, issued on November 14, 2008, PM and PM10 emissions shall not exceed the limits in the table below:

Unit (Stack)	PM Limits			PM10 Limits		
	(gr/dscf)	(lb/hr)	(ton/yr)	(gr/dscf)	(lb/hr)	(ton/yr)
5502-3 (5502-3) 5502-4 (5502-3)	0.01	1.003	4.393	0.01	1.003	4.393

(5) Pursuant to SPM No. 097-34377-00042, issued on January 22, 2015, PM and PM10 emissions shall not exceed the limits in the table below:

Unit (Stack)	PM Limits			PM10 Limits		
	(gr/dscf)	(lb/hr)	(ton/yr)	(gr/dscf)	(lb/hr)	(ton/yr)
5503-2 (5503-2) 5503-3 (5503-2) 5503-4 (5503-2) 5503-5 (71-7)	0.01	0.74	3.24	0.01	0.74	3.24
5502-6 (5502-6)	0.01	1.035	4.533	0.01	1.035	4.533

(6) Pursuant to T097-34650-00042, PM and PM10 emissions shall not exceed the limits in the table below:

Unit (Stack)	PM Limits			PM10 Limits		
	(gr/dscf)	(lb/hr)	(ton/yr)	(gr/dscf)	(lb/hr)	(ton/yr)
5552-2 (5552-2)	0.01	0.03	0.13	0.01	0.03	0.13
5552-1 (5552-1)	0.01	0.21	0.92	0.01	0.21	0.92

Compliance with these limits, in combination with other limits, will limit the net emissions increase of the 1997 Modification (CP 097-00042-97-01), the 1999 Modification (CP 097-00042-99-01) and the 2000 Modification (SSM No. 097-11362-00042) each to less than twenty-five (25) tons of PM and fifteen (15) tons of PM10 per twelve (12) consecutive month period and shall render the requirements of 326 IAC 2-3 (Emission Offset) and 326 IAC 2-2 (Prevention of Significant Deterioration not applicable to the 1997 Modification and shall render the requirements of 326 IAC 2-2 not applicable to the 1999 and 2000 Modifications.

(c) In order to render the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) not applicable to the 2000 Modification (SSM No. 097-11362-00042, issued on August 30, 2000), the Permittee shall comply with the following:

(1) Pursuant to T097-7714-00042, issued on April 14, 2004, PM and PM10 emissions shall not exceed the limits in the table below:

Unit (Stack)	PM Limits			PM10 Limits		
	(gr/dscf)	(lb/hr)	(ton/yr)	(gr/dscf)	(lb/hr)	(ton/yr)
5549-21 (5549-21)	0.01	1.2	5.27	0.01	1.2	5.27
5549-26 (5549-26)	0.01	0.26	1.16	0.01	0.26	1.16

(2) Pursuant to T097-34650-00042, PM and PM10 emissions shall not exceed the limits in the table below:

Unit (Stack)	PM Limits			PM10 Limits		
	(gr/dscf)	(lb/hr)	(ton/yr)	(gr/dscf)	(lb/hr)	(ton/yr)
577-2 (577-2)	0.01	0.82	3.59	0.01	0.82	3.59
5549-17 (5549-17)	0.01	0.04	0.18	0.01	0.04	0.18
5549-18 (5514-18)	0.01	0.28	1.23	0.01	0.28	1.23
5549-19 (5549-19)	0.01	0.24	1.05	0.01	0.24	1.05
5549-20 (5549-20)	0.01	0.93	4.07	0.01	0.93	4.07

Compliance with these limits, in combination with other limits, will limit the net emissions increase of the 2000 Modification (SSM No. 097-11362-00042) to less than twenty-five (25) tons of PM and fifteen (15) tons of PM10 per twelve (12) consecutive month period and shall render the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) not applicable to the 2000 Modification.

D.2.2 Particulate Matter [326 IAC 6.5-1-2]

Pursuant to 326 IAC 6.5-1-2(a), particulate matter emissions from units 71-7, 577-2, 577-5 through 577-10, 5502-3, 5502-4, 5502-5, 5502-6, 5503-1 through 5503-5, 5549-3, 5549-4, 5549-7 through 5549-10, 5549-12, 5549-13, 5549-14, the spray agglomeration process (consisting of units 5549-17 through 5549-21 and 5549-26), 5552-1, and 5552-2 shall each not exceed 0.03 grain per dry standard cubic foot (gr/dscf).

D.2.3 Particulate Matter [326 IAC 6.5-6-25]

Pursuant to 326 IAC 6.5-6-25(a), units 42-10, 56-1, and 71-1 shall meet the emission limits as indicated in the table below:

Unit	PM Limit (gr/dscf)	PM Limit (ton/yr)
42-10	0.030	2.4
56-1	0.020	7.02
71-1	0.030	0.9

D.2.4 Preventive Maintenance Plan [326 IAC 2-7-5(12)]

A Preventive Maintenance Plan is required for these units and their control devices. Section B - Preventive Maintenance Plan contains the Permittee's obligation with regard to the preventive maintenance plan required by this condition.

Compliance Determination Requirements [326 IAC 2-7-5(1)]

D.2.5 Particulate Control

(a) In order to ensure compliance with Conditions D.2.1, D.2.2, and D.2.3, the baghouses for particulate control, including those integral to the process, shall be in operation and control particulate emissions from the respective units listed in this section at all times those units are in operation.

(b) In order to ensure compliance with Conditions D.2.1 and D.2.2, the high efficiency cyclones for particulate control shall be in operation and control particulate emissions from units 5502-5 and 5502-6 at all times the respective units are in operation.

Compliance Monitoring Requirements [326 IAC 2-7-5(1)][326 IAC 2-7-6(1)]

D.2.6 Visible Emissions Notations [40 CFR 64]

(a) Visible emission notations of the exhaust from stacks 42-10, 56-1, 71-7, 5502-3, 5502-5, 5502-6, 5503-2, 5549-13, 5549-20, and 5549-21 shall be performed once per day during normal daylight operations. A trained employee shall record whether emissions are normal or abnormal.

(b) For processes operated continuously, "normal" means those conditions prevailing, or expected to prevail, eighty percent (80%) of the time the process is in operation, not counting startup or shut down time.

(c) In the case of batch or discontinuous operations, readings shall be taken during that part of the operation that would normally be expected to cause the greatest emissions.

(d) A trained employee is an employee who has worked at the plant at least one (1) month and has been trained in the appearance and characteristics of normal visible emissions for that specific process.

(e) If abnormal emissions are observed, the Permittee shall take a reasonable response. Section C - Response to Excursions or Exceedances contains the Permittee's obligation with regard to the reasonable response steps required by this condition. Failure to take response steps shall be considered a deviation from this permit.

D.2.7 Visible Emissions Notations

(a) Visible emission notations of the exhaust from stacks 577-2, 577-5 through 577-10, 5503-1, 5549-3, 5549-4, 5549-7 through 5549-10, 5549-12, 5549-14, 5549-17 through 5549-19, 5549-26, 5552-1, and 5552-2 shall be performed once per day during normal daylight operations. A trained employee shall record whether emissions are normal or abnormal.

(b) For processes operated continuously, "normal" means those conditions prevailing, or expected to prevail, eighty percent (80%) of the time the process is in operation, not counting startup or shut down time.

(c) In the case of batch or discontinuous operations, readings shall be taken during that part of the operation that would normally be expected to cause the greatest emissions.

(d) A trained employee is an employee who has worked at the plant at least one (1) month and has been trained in the appearance and characteristics of normal visible emissions for that specific process.

(e) If abnormal emissions are observed, the Permittee shall take a reasonable response. Section C- Response to Excursions or Exceedances contains the Permittee's obligation with regard to the reasonable response steps required by this condition. Failure to take response steps shall be considered a deviation from this permit.

D.2.8 Parametric Monitoring for Baghouses [40 CFR 64]

The Permittee shall monitor and record the pressure drop across the baghouses used in conjunction with units 42-10, 56-1, 71-7, 5502-3, 5502-4, 5503-2, 5503-3, 5503-4, 5549-13, 5549-20, and 5549-21 at least once per day when the associated units are in operation. When for any one reading, a pressure drop is outside the normal range, the Permittee shall take a reasonable response. The normal ranges for these units are indicated in the table below, unless a different upper-bound or lower-bound value for these ranges is determined during the latest stack test. Section C - Response to Excursions or Exceedances contains the Permittee's obligation with regard to the response steps required by this condition. A pressure drop that is outside the above mentioned ranges is not a deviation from this permit. Failure to take response steps shall be considered a deviation from this permit.

Unit ID	Stack ID	Normal Pressure Drop Range (inches of water)
42-10	42-10	1.0 - 8.0
56-1	56-1	1.0 - 8.0
71-7	71-7	1.0 - 8.0

Unit ID	Stack ID	Normal Pressure Drop Range (inches of water)
5502-3	5502-3	1.0 - 8.0
5502-4		
5503-2	5503-2	0.5 - 7.0
5503-3		
5503-4		
5549-13	5549-13	1.0 - 8.0
5549-20	5549-20	0.5 - 7.0
5549-21	5549-21	0.5 - 7.0

The instrument used for determining the pressure shall comply with Section C - Instrument Specifications, of this permit, shall be subject to approval by IDEM, OAQ, and shall be calibrated or replaced at least once every six (6) months.

D.2.9 Broken or Failed Bag Detection

(a) For a single compartment baghouse controlling emissions from a process operated continuously, a failed unit and the associated process shall be shut down immediately until the failed unit has been repaired or replaced. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of this permit (Section B - Emergency Provisions).

(b) For a single compartment baghouse controlling emissions from a batch process, the feed to the process shall be shut down immediately until the failed unit has been repaired or replaced. The emissions unit shall be shut down no later than the completion of the processing of the material in the line. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of this permit (Section B - Emergency Provisions).

Bag failure can be indicated by a significant drop in the baghouse pressure reading with abnormal visible emissions, by an opacity violation, or by other means such as gas temperature, flow rate, air infiltration, leaks, dust traces or triboflows.

D.2.10 Cyclone Failure Detection

In the event that cyclone failure has been observed:

Failed units and the associated process will be shut down immediately until the failed units have been repaired or replaced. The emissions unit shall be shut down no later than the completion of the processing of the material in the emissions unit. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of this permit (Section B - Emergency Provisions).

Record Keeping and Reporting Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

D.2.11 Record Keeping Requirements

(a) To document the compliance status with Condition D.2.1(b)(2), the Permittee shall maintain monthly records of the input of starch for unit 5549-13.

(b) To document the compliance status with Condition D.2.6, the Permittee shall maintain records of the daily visible emission notations of the exhaust from stacks 42-10, 56-1, 71-7, 5502-3, 5502-5, 5502-6, 5503-2, 5549-13, 5549-20, and 5549-21. The Permittee shall include in its daily record when a visible emission notation is not taken and the reason for the lack of visible emission notation (e.g. the process did not operate that day).

(c) To document the compliance status with Condition D.2.7, the Permittee shall maintain records of the daily visible emission notations of the exhaust from stacks 577-2, 577-5 through 577-10, 5503-1, 5549-3, 5549-4, 5549-7 through 5549-10, 5549-12, 5549-14, 5549-17 through 5549-19, 5549-26, 5552-1, and 5552-2. The Permittee shall include in its daily record when a visible emission notation is not taken and the reason for the lack of visible emission notation (e.g. the process did not operate that day).

(d) To document the compliance status with Condition D.2.8, the Permittee shall maintain records of the daily pressure drop across the baghouses used in conjunction with units 42-10, 56-1, 71-7, 5502-3, 5502-4, 5503-2, 5503-3, 5503-4, 5549-13, 5549-20, and 5549-21. The Permittee shall include in its daily record when a pressure drop reading is not taken and the reason for the lack of a pressure drop reading (e.g. the process did not operate that day).

(e) Section C - General Record Keeping Requirements of this permit contains the Permittee's obligation with regard to the records required by this condition.

D.2.12 Reporting Requirements

A quarterly summary of the information to document the compliance status with Condition D.2.1(b)(2) shall be submitted not later than thirty (30) days after the end of the quarter being reported. Section C - General Reporting contains the Permittee's obligation with regard to the reporting required by this condition. The reports submitted by the Permittee do require a certification that meets the requirements of 326 IAC 2-7-6(1) by a “responsible official,” as defined by 326 IAC 2-7-1(35).

SECTION D.3 EMISSIONS UNIT OPERATION CONDITIONS

Emissions Unit Description:

(oo) Grinding and machining operations controlled with fabric filters with a design grain loading of less than or equal to 0.03 grains per actual cubic foot and a gas flow rate less than or equal to 4000 actual cubic feet per minute, including the following: deburring, buffing, polishing, abrasive blasting, pneumatic conveying, and woodworking operations:

(1) One (1) DSE Hopper #9, identified as unit 42-3A, with a maximum throughput of 10 tons/hr, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 6.

(2) One (1) DSE Hopper #10, identified as unit 42-3B, with a maximum throughput of 10 tons/hr, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 7.

(3) One (1) DSE Hopper #11, identified as unit 42-3C, with a maximum throughput of 10 tons/hr, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 43-3C.

(4) One (1) DSE Hopper #12, identified as unit 42-3D, with a maximum throughput of 10 tons/hr, with a maximum air throughput of 3,600 dscfm, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 9.

(5) One (1) DSE Hopper #13, identified as unit 42-3E, with a maximum throughput of 10 tons/hr, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 10.

(6) One (1) DSE Hopper #14, identified as unit 42-3F, with a maximum throughput of 10 tons/hr, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack11.

(7) One (1) DSE Hopper #2, identified as unit 42-7A, with a maximum throughput of 10 tons/hr, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 14.

(8) One (1) DSE Hopper #4, identified as unit 42-7B, with a maximum throughput of 10 tons/hr, with a maximum air throughput of 2,600 dscfm, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 14.

(9) One (1) DSE Hopper #6, identified as unit 42-7C, with a maximum throughput of 10 tons/hr, with a maximum air throughput of 2,600 dscfm, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 16.

(10) One (1) DSE Hopper #1, identified as unit 42-8A, with a maximum throughput of 10 tons/hr, using a baghouse** for particulate control, constructed prior to 1968, and exhausting to stack 17A.

(11) One (1) DSE Hopper #3, identified as unit 42-8B, with a maximum throughput of 10 tons/hr, using a baghouse** for particulate control, constructed prior to 1968, and exhausting to stack 17B.

(12) One (1) DSE Hopper #5, identified as unit 42-8C, with a maximum throughput of 10 tons/hr, using a baghouse** for particulate control, constructed prior to 1968, and

exhausting to stack 17C.

(13) One (1) DSE Hopper #7, identified as unit 42-8D, with a maximum throughput of 10 tons/hr, using a baghouse** for particulate control, constructed prior to 1968, and exhausting to stack 17D.

(14) One (1) CWS #8; identified as unit 63-1A, with a maximum throughput of 1 tons/hr, with a maximum air throughput of 2,400 dscfm, using a baghouse* for particulate control, constructed prior to 1968, and modified in 1976, and exhausting to stack 46A.

(15) One (1) CWS South Mill, identified as unit 63-17, constructed in 1977, approved in 2021 for modification, with a maximum throughput of 0.8 tons/hr, using a baghouse** (replaced baghouse in 2008) for particulate control, and exhausting to stack 53.

(pp) One (1) Grain Elevator, identified as unit 56-2, with a maximum throughput of 80 tons/hr, using a baghouse** for particulate control, constructed prior to 1968, and exhausting to stack 24.

(qq) Starch operations, starch drying, starch handling and starch packaging consisting of the following units:

(1) One (1) Starch Mixer 1 Filter Receiver, identified as 152-1, with a maximum air throughput of 500 dscfm, using a baghouse* for particulate control, constructed in 2002, and exhausting to stack 152-1.

(2) One (1) Mixer 1 baghouse, identified as 152-2, with a maximum air throughput of 1,000 dscfm, using a baghouse* for particulate control, constructed in 2002 and approved in 2011 for modification, and exhausting to stack 152-2.

(3) One (1) Starch Mixer 2 Filter/Receiver, identified as 152-4, with a maximum air throughput of 600 dscfm, using a baghouse* for particulate control, constructed on in 2002, and exhausting to stack152-4.

(4) One (1) Starch Mixer 2, identified as 152-5, with a maximum air throughput of 1,000 dscfm, using a baghouse* for particulate control, constructed in 2002, and exhausting to stack 152-5.

(5) One (1) Base Bin, identified as 152-6, with a maximum throughput of 15 tons/hr, using a baghouse** for particulate control, constructed in 2003, and exhausting to stack 152-6.

(6) One (1) Mixer 3-4 Transfer Dust Collector, identified as unit 152-7, with a maximum air throughput of 500 dscfm, using a baghouse** for particulate control, constructed in 2004, and exhausting to stack 152-7.

(7) One (1) Starch Mixer 4 Filter Receiver, identified as unit 152-8, with a maximum air throughput of 600 dscfm, using a baghouse** for particulate control, constructed in 2004, and exhausting to stack 152-8.

(8) One (1) Starch Mixer 4, identified as unit 152-9, with a maximum air throughput of 20 dscfm, using a baghouse** for particulate control, constructed in 2004, and exhausting to stack 152-9.

(9) One (1) Starch Mixer 3 Filter Receiver, identified as unit 152-10, with a maximum air 600 dscfm, using a baghouse** for particulate control, constructed in 2004, and exhausting to stack 152-10.

(10) One (1) Starch Mixer 3, identified as unit 152-11, with a maximum air throughput of 1,000 dscfm, using a baghouse* for particulate control, constructed in 2004 and approved in 2011 for modification, and exhausting to stack 152-11.

(11) One (1) Bulk Bag Dump Receiver, identified as 152-12, with a maximum air throughput of 800 dscfm, using a baghouse* for particulate control, constructed in 2004, and exhausting to stack 152-12.

(12) One (1) Product Silo, identified as Bin TF41820 (formerly unit 61-21), with a maximum throughput of 15 tons/hr, with a maximum air throughput of 589 dscfm, using a baghouse* for particulate control, constructed in 1976, modified in 1981, approved in 2010 for additional modification, and exhausting to stack 152-3.

(13) One (1) Starch Cooling and Conveying System, identified as TF41818 (formerly unit 581-2), with a maximum air throughput of 14,000 dscfm, using a baghouse* for particulate control, constructed in 1983 and approved in 2010 for modification, and exhausting to stack TF41818.

(14) One (1) Blending Bin, identified as 152-15 (formerly unit TF41819), with a maximum air throughput of 4,000 dscfm, using a baghouse* for particulate control, approved in 2010 for construction, and exhausting to stack DC41819.

(15) One (1) Sodium Sulfate Conveying System, including a silo and receiver, identified as units 40-1A and 40-1B, with a maximum throughput of 15 tons/hr, with maximum air throughputs of 1,400 dscfm and 1,250 dscfm, using two baghouses* for particulate control, constructed prior to1968 and modified in 1998, and exhausting to stacks 40-1A and 40-1B.

(16) One (1) DSE North Packer, identified as unit 42-1, with a maximum throughput of 30 tons/hr, using a baghouse* for particulate control, constructed prior to 1968 and modified in 1996, and exhausting to stack 5.

(17) One (1) DSE Hopper #8, identified as unit 42-4, with a maximum throughput of 13.95 tons/hr, with a maximum air throughput of 4,200 dscfm, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 17E.

(18) One (1) DSE Negative Receiver, identified as unit 42-6, with a maximum throughput of 10 tons/hr, using a baghouse* for particulate control, constructed prior to1968, and exhausting to stack 13.

(19) One (1) DSE South Packer, identified as unit 42-9, with a maximum throughput of 30 tons/hr, using a baghouse* for particulate control, constructed prior to 1968 and modified in 1996, and exhausting to stack 18.

(20) One (1) DSE Railcar Loading - East Track, identified as unit 42-11, with a maximum throughput of 18 tons/hr, using a baghouse* for particulate control, constructed in 1978, and exhausting to stack 20.

(21) One (1) DSE Railcar Loading - West Track, identified as unit 42-12, with a maximum throughput of 18 tons/hr, using a baghouse* for particulate control, constructed in 1978, and exhausting to stack 21.

(22) One (1) DSE Bulk Bag System, identified as unit 42-13, with a maximum throughput of 30 tons/hr, with a maximum air throughput of 4,500 dscfm, using a receiver/baghouse*

for particulate control, constructed in 1997, and exhausting to stack 106.

(23) One (1) Dextrin Blend, identified as unit 61-14, with a maximum throughput of 7.5 tons/hr, using hopper/filter receiver using a baghouse** for particulate control, constructed prior to 1973, and exhausting to stack 61-14.

(24) One (1) CWS #7 Dryer Receiver, identified as unit 63-3, with a maximum air throughput of 2,000 dscfm, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 47.

(25) One (1) CWS North Product, identified as unit 63-5, with a maximum throughput of 2.5 tons/hr, using a baghouse* for particulate control, constructed prior to 1974 and approved in 2021 for modification, and exhausting to stack 49.

(26) One (1) CWS Packer, identified as unit 63-9, with a maximum throughput of 20 tons/hr, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 50.

(27) One (1) CWS #9 and #10 Dryers Receiver, identified as unit 63-15, with a maximum air throughput of 3,600 dscfm, using a baghouse* for particulate control, constructed in 1975 and modified in 2010, and exhausting to stack 52.

(28) CWS #11 Dryer and CWS #12 and #13 Dryers, identified as units 63-16A and 63-16B, each with a maximum air throughput of 3,300 dscfm, using two baghouses* for particulate control, constructed prior to August 7, 1977, and exhausting to stacks 54A and 54B.

(29) One (1) DSW Negative Receiver, identified as unit 63-20, with a maximum throughput of 5 tons/hr, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 56.

(30) One (1) Negative Receiver, identified as unit 71-3, with a maximum throughput of 15 tons/hr, using a baghouse* for particulate control, constructed prior to 1968, and exhausting to stack 71-3.

(31) One (1) DSW Bulk Car Loading, identified as unit 71-8, with a maximum throughput of 15 tons/hr, using a baghouse* for particulate control, constructed in 1971, and exhausting to stack 72.

(32) One (1) RSP South Bulk Bag Packing, identified as unit 577-1, with a maximum throughput of 15 tons/hr, using a baghouse* for particulate control, constructed in 1978, and exhausting to stack 77.

(33) One (1) FG Bulk Bag Bin Vent, identified as unit FA-60582, with a maximum throughput of 18 tons/hr, with a maximum air throughput of 3,800 dscfm, using a baghouse** for particulate control, constructed in 2003, and exhausting to stack FA-60582.

(34) One (1) RSP South Packing Line, identified as unit 577-3, with a maximum throughput of 18 tons/hr, using a baghouse* for particulate control, constructed in 1978, and exhausting to stack 79.

(35) One (1) RSP Bulk Loading System A, identified as unit 577-4, with a maximum throughput of 18 tons/hr, using a baghouse* for particulate control, constructed in 1978, and exhausting to stack 80.

(36) One (1) RSP Bulk Loading Fugitive Dust Collector**, identified as unit 577-4A, with a maximum throughput of 18 tons/hr and an actual throughput of 18 lbs/hr, constructed in 1986, and exhausting to stack 81.

(37) One (1) aspiration line, constructed in 2017, assisting air flow within the DSS bulk loadout screener SR60585, and exhausting to RSP Bulk Loading Fugitive Dust Collector, 577-4A.

(38) One (1) CWS Conveying Cyclone Operation, identified as unit 578-1, with a maximum throughput of 7.5 tons/hr, using a baghouse** for particulate control, returned to service in 2008, and exhausting through stack 578-1.

(39) One (1) CWS Packing Hopper, identified as unit 578-2, with a maximum throughput of 1 tons/hr, using a baghouse* for particulate control, constructed in 1978, and exhausting to stack 89.

(40) One (1) CWS Milling System, identified as unit 578-3, with a maximum throughput of 1.5 tons/hr, using a baghouse* for particulate control, constructed in 1978, and approved for modification in 2018, exhausting to stack 578-3, consisting of one (1) Aspiration Line, constructed in 2018, assisting air flow within the CWS Milling System, and a fine grind mill, using a cyclone (CY-41146) for particulate control, and exhausting to stack 578-3.

(41) One (1) Drum A Product Receiver, identified as DC700, with a maximum flow rate of 1750 dscfm, constructed in 1978, modified on April 13, 2016 and 2018, using a dust collector for control, and exhausting to stack 578-4.

(42) One (1) Drum B Product Receiver, identified as DC701, with a maximum flow rate of 1750 dscfm, constructed in 1978, modified on April 13, 2016 and 2018, using a dust collector for control, and exhausting to stack 578-5.

(43) One (1) Product Bin 93, identified as unit TF31993 (formerly unit TF31901), with a maximum air throughput of 3,000 dscfm, using product recovery DC-31993* for particulate control, constructed in 2004 and approved in 2015 for modification, and exhausting to stack 1-158.

(44) One (1) Product Bin 92, identified as unit TF31992 (formerly unit TF31902), with a maximum air throughput of 2,000 dscfm, using product recovery DC-31992* for particulate control, constructed in 2004 and approved in 2015 for modification, and exhausting to stack 2-158.

(45) One (1) Product Bin 91, identified as unit TF31991, with a maximum air throughput of 2,000 dscfm, using product recovery DC-31991* for particulate control, constructed in 2004 and approved in 2015 for modification, and exhausting to stack 3-158.

(46) One (1) Surge Tank Bin 158-3, identified as unit SH31913, with a maximum air throughput of 200 dscfm, using product recovery DC-31911** for particulate control, constructed in 2004, and exhausting to stack 7-158.

(47) One (1) Bulk Bag Unload Bin 158-4, identified as unit DC-31900 with a maximum air throughput of 600 dscfm, using a dust collector* for particulate control, constructed in 2004, and exhausting to stack 8-158.

(48) One (1) FBR1 Exhaust, identified as unit TR31912, with a maximum air throughput of

8,800 dscfm, using product recovery metal filters** for particulate control, constructed in 2004, and exhausting to stack 5-158.

(49) One (1) FBR1 Cooling System, identified as TR31913, approved in 2014 for installation, with a product throughput of 15,000 pounds per hour, using a cyclone (CY31917)* and baghouse (DC31917)* for product recovery and particulate control, and exhausting to stack 9-158.

(50) One (1) starch dryer, identified as unit PAC-1, with a maximum production rate of 300 lbs/hr, using a product collector/cyclone and dust collector* for particulate control, constructed in 2005, and exhausting to stack PAC-1.

(51) One (1) distillation system, identified as PAC-2, using a scrubber for propylene oxide control and exhausting to stack PAC-2.

(52) One (1) Line 1 South Packing Hopper, identified as unit 5549-22, with a maximum air throughput of 4,800 dscfm, using a baghouse* for particulate control, constructed in 2006, and exhausting to stack 5549-22.

(53) Three (3) Base Bins (80, 81, and 82), identified as units TF31980, TF31981, and TF31982, respectively, each with a maximum air throughput of 1,275 dscfm, using product recovery DC31980*, DC31981*, and DC31982*, respectively, for particulate control, constructed in 2016, and exhausting to stacks 10-158, 11-158, and 12-158.

(54) One (1) FBR2 Exhaust, identified as unit TR31922, with a maximum air throughput of 6,000 dscfm, using product recovery metal filters* for particulate control, constructed in 2016, and exhausting to stack 14-158.

(55) One (1) FBR2 Cooling Reactor, identified as unit TR31923, with a maximum air throughput of 4,300 dscfm, using product recovery metal filters* for particulate control, constructed in 2016, and exhausting to stack 15-158.

(56) One (1) Product Bin 90, identified as unit TF31990, using product recovery DC31990* for particulate control, with a maximum air throughput of 2,200 dscfm, constructed in 2016, and exhausting to stack 13-158.

(57) One (1) Base Bin, identified as TF41822, constructed in 2017, with a maximum air throughput of 2,060 dscfm, using product recovery DC41822* as particulate control, and exhausting to stack 152-13.

(58) One (1) DSW Product Silo, identified as unit TF34031, constructed in 2019, with a maximum storage capacity of 45 tons and a maximum throughput of 1.75 tons per hour, using filter DC34031 for particulate control, exhausting to stack S34031.

(59) One (1) DSW Product Silo, identified as unit TF34032, constructed in 2019, with a maximum storage capacity of 45 tons and a maximum throughput of 1.75 tons per hour, using filter DC34032 for particulate control, exhausting to stack S34032.

(60) One (1) DSW Product Silo, identified as unit TF34033, constructed in 2019, with a maximum storage capacity of 45 tons and a maximum throughput of 1.75 tons per hour, using filter DC34033 for particulate control, exhausting to stack S34033.

(61) One (1) DSW Product Silo, identified as unit TF34034, constructed in 2019, with a maximum storage capacity of 45 tons and a maximum throughput of 1.75 tons per hour, using filter DC34034 for particulate control, exhausting to stack S34034.

(62) One (1) Product Bin 94, identified asTF31994, approved in 2019 for construction, with a maximum air throughput of 3,000 dscfm, using product recovery DC-31994 * for particulate control, and exhausting to stack 25-158.

(63) One (1) Base Bin 83, identified as unit TF31983, approved in 2019 for construction, with a maximum air throughput of 1,275 dscfm, using product recovery DC31983 * for particulate control, and exhausting to stack 24-158.

(64) One (1) FBR3 Reactor, identified as unit TR31932, approved in 2019 for construction, and with a maximum air throughput of 6,000 dscfm, using product recovery metal filters * for particulate control, exhausting to stack 19-158.

(65) One (1) FBR3 Cooling Reactor, identified as unit TR31933, approved in 2019 for construction, with a maximum air throughput of 4,300 dscfm, using product recovery metal filters * for particulate control, and exhausting to stack 20-158.

*The control device is considered both integral to the process and inherent to the process for CAM applicability. Inherent process equipment is not subject to Compliance Assurance Monitoring (CAM).

**The control device is considered inherent to the process for CAM applicability. Inherent process equipment is not subject to Compliance Assurance Monitoring (CAM).

(The information describing the process contained in this emissions unit description box is descriptive information and does not constitute enforceable conditions.)

Emission Limitations and Standards [326 IAC 2-7-5(1)]

D.3.1 PSD and Emission Offset Minor Limits [326 IAC 2-2][326 IAC 2-3]

(a) Pursuant to SPM No. 097-29534-00042, issued on November 22, 2010, in order to render the requirements of 326 IAC 2-2 (PSD) and 326 IAC 2-3 (Emission Offset) not applicable, the PM, PM10 and PM2.5 emissions from stacks TF41818, DC41819, and 152-3 shall be less than the emission limits listed in the table below:

Equipment Description	Stack ID	PM Emission Limit (lb/hr)	PM10 Emission Limit (lb/hr)	PM2.5 Emission Limit (lb/hr)
One (1) Starch Cooling and Conveying System (TF41818)	stack TF41818	3.97	2.38	1.59
One (1) Blending Bin (152-15)	stack DC41819	1.12	0.67	0.45
One (1) Starch Storage Silo #2 Receiver (TF41820)	stack 152-3	0.55	0.33	0.22

Compliance with the above limits will limit the potential to emit from this modification to less than twenty-five (25) tons of PM, fifteen (15) tons of PM_{10}, and ten (10) tons of $PM_{2.5}$ per twelve (12) consecutive month period, and shall render the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) and 326 IAC 2-3 (Emission Offset) not applicable to the 2010 Modification.

(b) Pursuant to SPM No. 097-30227-00046, issued on October 12, 2011, in order to render the requirements of 326 IAC 2-2 (PSD) and 326 IAC 2-3 (Emission Offset) not applicable, the PM, PM10 and PM2.5 emissions shall be less than the emission limits listed in the table below:

Unit Number	Stack ID	PM Emission Limit (lb/hr)	PM10 Emission Limit (lb/hr)	PM2.5 Emission Limit (lb/hr)
40-1A	stack 40-1A	0.13	0.13	0.13
40-1B	stack 40-1B	0.13	0.13	0.13
152-7	stack 152-7	0.43	0.30	0.17
152-8	stack 152-8	0.52	0.36	0.21
152-9	stack 152-9	0.10	0.05	0.05
152-10	stack 152-10	0.52	0.36	0.21
152-11	stack 152-11	0.86	0.60	0.34
FA-60582	stack FA-60582	1.63	0.80	0.65
152-12	stack 152-12	0.69	0.48	0.28
42-13	stack 106	0.50	0.10	0.10

Compliance with these limits will limit the potential to emit of the modification to less than twenty-five (25) tons of PM, fifteen (15) tons of PM10, and ten (10) tons of PM2.5 per twelve (12) consecutive month period, and shall render the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) and 326 IAC 2-3 (Emission Offset) not applicable to the 2011 Modification.

(c) Pursuant to MSM No. 097-35461-00042, issued on June 17, 2014, in order to render the requirements of 326 IAC 2-2 (PSD) not applicable, the PM, PM10, and PM2.5 emissions from TR31913 shall be less than the emission limits listed in the table below:

Unit Number	Stack ID	PM Emission Limit (lb/hr)	PM10 Emission Limit (lb/hr)	PM2.5 Emission Limit (lb/hr)
TR31913	9-158	1.71	1.71	1.71

Compliance with these limits will limit the emissions increase of the modification to less than twenty-five (25) tons of PM, fifteen (15) tons of PM10, and ten (10) tons of PM2.5 per twelve (12) consecutive month period, and shall render the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) not applicable to the 2014 Modification.

(d) Pursuant to MSM No. 097-35115-00042, issued on January 7, 2015 and MSM No. 097-35748-00042, issued on May 6, 2015, in order to render the requirements of 326 IAC 2-2 (PSD) not applicable, the PM, PM10, and PM2.5 emissions shall be less than the emission limits listed in the table below:

Unit Number	Stack ID	PM Emission Limit (lb/hr)	PM10 Emission Limit (lb/hr)	PM2.5 Emission Limit (lb/hr)
TF31980	10-158	0.055	0.055	0.055
TF31981	11-158	0.055	0.055	0.055
TF31982	12-158	0.055	0.055	0.055
TR31922	14-158	0.514	0.514	0.514
TR31923	15-158	0.369	0.369	0.369
TF31990	13-158	0.094	0.094	0.094

Compliance with these limits will limit the emissions increase of the modification to less than twenty-five (25) tons of PM, fifteen (15) tons of PM10, and ten (10) tons of PM2.5 per twelve (12) consecutive month period, and shall render the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) not applicable to the 2015 Modification.

(e) Pursuant to SSM No. 097-43933-00042, and in order to render the requirements of 326 IAC 2-2 (PSD) not applicable, the PM, PM10, and PM2.5 emissions shall be less than the emission limits listed in the table below:

Unit Number	Stack ID	PM Emission Limit (lb/hr)	PM10 Emission Limit (lb/hr)	PM2.5 Emission Limit (lb/hr)
63-17	53	5.63	5.63	5.63

Compliance with these limits will limit the emissions increase of the modification to less than twenty-five (25) tons of PM, fifteen (15) tons of PM10, and ten (10) tons of PM2.5 per twelve (12) consecutive month period and shall render the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) not applicable to the 2021 Modification.

D.3.2 Particulate Matter [326 IAC 6.5-1-2]

Pursuant to 326 IAC 6.5-1-2(a), particulate matter emissions from units 40-1A, 40-1B, 42-9, 42-11, 42-12, 42-13, 63-1A, 63-3, 63-5, 63-9, 63-15, 63-16A, 63-16B, 63-17, 63-20, 71-3, 71-8, 152-1, 152-2, 152-4 through 152-12, 152-15, 577-1, 577-3, 577-4, 577-4A, 578-1, 578-2, 578-3, DC700, DC701, 5549-22, DC-31900, FA-60582, SH31913, TF31993, TF31992, TR31912, TR31913, TF31991, PAC-1, TF41818, TF41820, TF31980, TF31981, TF31982, TR31922, TR31923, TF31990, TF41822, TF34031, TF34032, TF34033, TF34034, TF31994, TF31983, TR31932, and TR31933, shall each not exceed 0.03 grain per dry standard cubic foot (gr/dscf).

D.3.3 Particulate Matter [326 IAC 6.5-6-25]

Pursuant to 326 IAC 6.5-6-25(a), the following units shall meet the emission limits as indicated in the table below:

Unit	PM Limit (gr/dscf)	PM Limit (ton/yr)
56-2	0.010	11.3
61-14	0.028	1.2
42-4	0.029	2.3
42-1	0.030	0.9
42-6	0.03	2.5
42-8(A, B, C, and D)	0.030	4.2
42-7A	0.032	1.7
42-7B	0.032	1.7
42-7C	0.032	1.7
42-3A	0.032	1.8
42-3B	0.032	1.8
42-3C	0.032	1.8
42-3D	0.032	1.8
42-3E	0.032	1.8
42-3F	0.032	1.8

D.3.4 Preventive Maintenance Plan [326 IAC 2-7-5(12)]

A Preventative Maintenance Plan is required for these units and any control devices. Section B - Preventive Maintenance Plan contains the Permittee's obligation with regard to the preventive maintenance plan required by this condition.

Compliance Determination Requirements [326 IAC 2-7-5(1)]

D.3.5 Particulate Control

(a) In order to ensure compliance with Conditions D.3.1, D.3.2, and D.3.3 and in order to assure that the requirements of 326 IAC 2-2 (PSD) do not apply, the cyclones, baghouses, and metal filters for particulate control, including those integral to the process, shall be in operation and control particulate emissions from all units listed in this section at all times those respective units are in operation.

(b) In order to assure that the requirements of 326 IAC 2-2 (PSD) do not apply, the integral controls for particulate control associated with the CWS Milling System (CY-41146 and Drum A and Drum B dust collectors) shall be in operation and control emissions from the emission units at all times the emission units (578-3, DC700, and DC701) are in operation.

Compliance Monitoring Requirements [326 IAC 2-7-5(1)][326 IAC 2-7-6(1)]

D.3.6 Visible Emissions Notations

(a) Visible emission notations of the exhaust from the following stacks, shall be performed once per week during normal daylight operations. A trained employee shall record whether emissions are normal or abnormal.

Emission Unit	Stack I.D.
40-1A	40-1A
40-1B	40-1B
152-7	152-7
152-8	152-8
152-9	152-9
152-10	152-10
152-11	152-11
FA-60582	FA-60582
152-12	152-12
63-17	53
42-13	106
TF31980	10-158
TF31981	11-158
TF31982	12-158
TR31922	14-158
TR31923	15-158
TF31990	13-158
TF41822	152-13
TF34031	S34031
TF34032	S34032
TF34033	S34033
TF34034	S34034
TF31994	25-158
TF31983	24-158
TR31983	19-158
TR31933	20-158

(b) For processes operated continuously, "normal" means those conditions prevailing, or expected to prevail, eighty percent (80%) of the time the process is in operation, not counting startup or shut down time.

(c) In the case of batch or discontinuous operations, readings shall be taken during that part of the operation that would normally be expected to cause the greatest emissions.

(d) A trained employee is an employee who has worked at the plant at least one (1) month and has been trained in the appearance and characteristics of normal visible emissions for that specific process.

(e) If abnormal emissions are observed, the Permittee shall take a reasonable response. Section C- Response to Excursions or Exceedances contains the Permittee's obligation with regard to the reasonable response steps required by this condition. Failure to take response steps shall be considered a deviation from this permit.

D.3.7 Parametric Monitoring for Baghouses

The Permittee shall monitor and record the pressure drop across the baghouses used in conjunction with units TF41818, 152-15, TF41820, and TR31913, at least once per week when units TF41818, 152-15, TF41820, and TR31913, are in operation. When, for any one reading, the pressure drop across a baghouse is outside the normal range, the Permittee shall take a reasonable response. The normal ranges for these units are indicated in the table below, unless a different upper-bound or lower-bound value for this range is determined during the latest stack test. Section C- Response to Excursions or Exceedances contains the Permittee's obligation with regard to the reasonable response steps required by this condition. A pressure reading that is outside the above mentioned range is not a deviation from this permit. Failure to take response steps shall be considered a deviation from this permit.

Unit ID	Stack ID	Normal Pressure Drop Range (inches of water)
TF41818	TF41818	1.0 - 8.0
152-15	DC41819	1.0 - 8.0
TF41820	152-3	1.0 - 8.0
TR31913	9-158	1.0 - 8.0

The instrument used for determining the pressure shall comply with Section C - Instrument Specifications, of this permit, shall be subject to approval by IDEM, OAQ, and shall be calibrated or replaced at least once every six (6) months.

D.3.8 Broken or Failed Bag Detection

(a) For a single compartment baghouse controlling emissions from a process operated continuously, a failed unit and the associated process shall be shut down immediately until the failed unit has been repaired or replaced. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of this permit (Section B - Emergency Provisions).

(b) For a single compartment baghouse controlling emissions from a batch process, the feed to the process shall be shut down immediately until the failed unit has been repaired or replaced. The emissions unit shall be shut down no later than the completion of the processing of the material in the line. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of this permit (Section B - Emergency Provisions).

Bag failure can be indicated by a significant drop in the baghouse pressure reading with abnormal visible emissions, by an opacity violation, or by other means such as gas temperature, flow rate, air infiltration, leaks, dust traces or triboflows.

D.3.9 Cyclone Failure Detection

In the event that cyclone failure has been observed:

Failed units and the associated process will be shut down immediately until the failed units have been repaired or replaced. The emissions unit shall be shut down no later than the completion of the processing of the material in the emissions unit. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of this permit (Section B - Emergency Provisions).

Record Keeping and Reporting Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

D.3.10 Record Keeping Requirements

(a) To document the compliance status with Condition D.3.6, the Permittee shall maintain records of the weekly visible emission notations of the exhaust from stacks listed in that condition. The Permittee shall include in its weekly record when a visible emission notation is not taken and the reason for the lack of visible emission notation (e.g. the process did not operate that week).

(b) To document the compliance status with Condition D.3.7, the Permittee shall maintain records of the weekly pressure drop readings across the baghouses used in conjunction with units TF41818, 152-15, TF41820, and TR31913. The Permittee shall include in its weekly record when a pressure drop reading is not taken and the reason for the lack of a pressure drop reading (e.g. the process did not operate that week).

(c) Section C - General Record Keeping Requirements of this permit contains the Permittee's obligation with regard to the records required by this condition.

SECTION D.4 EMISSIONS UNIT OPERATION CONDITIONS

Emissions Unit Description:

(a) Stationary fire pump engines, including:

(1) One (1) 210-horsepower diesel-fired emergency fire pump engine, identified as FP1, constructed in 2003.

Under 40 CFR 63, Subpart ZZZZ, FP1 is considered an existing affected source.

(2) One (1) 300-horsepower diesel-fired emergency fire pump engine, identified as FP2, constructed in 2003.

Under 40 CFR 63, Subpart ZZZZ, FP2 is considered an existing affected source.

(3) One (1) 300-horsepower diesel-fired emergency fire pump engine, identified as FP3, constructed in 2006.

Under 40 CFR 63, Subpart ZZZZ, FP3 is considered a new affected source. Under 40 CFR 60, Subpart IIII, FP3 is considered an affected facility.

(b) Combustion related activities including spaces heaters, process heaters, or boilers using natural gas-fired with heat input equal to or less than ten million (10,000,000) British thermal units per hour:

(1) One (1) process heater, Bld 630, natural gas fired, with maximum heat input capacity of 5.1 MMBtu/hr, identified as emission unit YX31914A, constructed in 2004 and venting out stack 158-6.

(2) One (1) natural gas-fired FBR2 Burner, identified as unit FH31924, with a maximum capacity of 3.0 MMBtu/hr, approved in 2015 for construction, and exhausting to stack 16-158.

(3) Two (2) natural gas-fired Air Heater Burners, identified as Air Heater 1 and Air Heater 2, units EF31926A and EF31927A, respectively, approved in 2015 for construction, each with a maximum heat input capacity of 0.4 MMBtu/hr, and exhausting to stacks 17-158 and 18-158.

(4) Drover CWS direct-fired air heaters, with a maximum total heat input capacity of 4.50 MMBtu/hr.

(5) One (1) natural gas-fired FBR3 Burner, identified as unit FH31934, approved in 2019 for construction, with a maximum capacity of 3.0 MMBtu/hr, and exhausting to stack 21-158.

(6) One (1) natural gas-fired Dehumidifier Air Heater 1, identified as EF31936A, approved in 2019 for construction, with a maximum heat input capacity of 0.4 MMBtu/hr, and exhausting to stack 22-158.

(7) One (1) natural gas-fired Dehumidifier Air Heater 2, identified as EF31937A, approved in 2019 for construction, with a maximum heat input capacity of 0.4 MMBtu/hr, and exhausting to stack 23-158.

(c) Two (2) degreasing operations, identified as D1 and D2, each with a maximum annual solvent usage of 465 gallons, and each resulting in potential uncontrolled VOC emissions of less than three (3) pounds per hour and fifteen (15) pounds per day.

(d) Paved and unpaved roads and parking lots with public access.

(e) Emissions from a laboratory, as defined in 326 IAC 2-7-1(21)(G).

(f) A gasoline fuel transfer dispensing operation handling less than or equal to 1,300 gallons per day and less than 10,000 gallons per month, filling storage tanks having a capacity equal to or less than 10,500 gallons. Under 40 CFR 63, Subpart CCCCCC, this is considered an existing affected source.

(g) A petroleum fuel other than gasoline dispensing facility, having a storage tank capacity less than or equal to 10,500 gallons, and dispensing 3,500 gallons per day or less.

(h) Storage tanks with capacity less than or equal to 1,000 gallons and annual throughputs equal to or less than 12,000 gallons.

(i) Vessels storing the following: Lubricating oils, Hydraulic oils, Machining oils, Machining fluids.

(j) Grinding and machining operations controlled with fabric filters, scrubbers, mist collectors, wet collectors, and electrostatic precipitators with a design grain loading of less than or equal to 0.03 grains per actual cubic foot and a gas flow rate less than or equal to 4,000 actual cubic feet per minute, including the following: abrasive blasting, identified as S1.

(k) Three (3) acetic acid storage tanks, identified as T1, with a capacity no greater than sixteen thousand (16,000) gallons each.

(l) Four (4) hydrochloric acid storage tanks, identified as T2, with a capacity no greater than sixteen thousand (16,000) gallons each.

(m) Ten (10) small batch reactors, identified as Tanks 190, 191, 192, 193, 200, 201, 203, 211, 212, and 213, using no controls and exhausting to stacks 190, 191, 193, 200, 201, 203, 211, 212, and 213, respectively.

(p) Six (6) portable diesel fuel oil-fired heaters, constructed in 2015, each with a maximum heat input capacity of 0.41 MMBtu/hr and a sulfur content of 0.0015%.

(q) Twenty-five (25) portable diesel fuel oil-fired heaters, constructed in 2016, each with a maximum heat input capacity of 0.41 MMBtu/hr and a sulfur content of 0.0015%.

(The information describing the process contained in this emissions unit description box is descriptive information and does not constitute enforceable conditions.)

Emission Limitations and Standards [326 IAC 2-7-5(1)]

D.4.1 Particulate Matter [326 IAC 6.5-1-2]

Pursuant to 326 IAC 6.5-1-2(a), particulate matter emissions from emergency fire pump engines FP1, FP2, and FP3; process heater YX31914A; FBR2 burner FH31924; Air Heater Burners EF31926A and EF31927A; Drover CWS direct-fired air heaters; abrasive blasting S1, the FBR3 Burner (FH31934), the two Dehumidifier Air Heaters (EF31936A and EF31937A), and the thirty-one (31) portable diesel fuel oil heaters, shall each not exceed 0.03 grain per dry standard cubic foot (gr/dscf).

D.4.2 Sulfur Content

The sulfur content of the thirty-one (31) portable diesel fuel oil-fired heaters shall not exceed 0.0015%.

D.4.3 Cold Cleaner Degreaser Control Equipment and Operating Requirements [326 IAC 8-3-2]

Pursuant to 326 IAC 8-3-2 (Cold Cleaner Degreaser Control Equipment and Operating Requirements), the Permittee shall:

(a) Ensure the following control equipment and operating requirements are met:

(1) Equip the degreaser with a cover.

(2) Equip the degreaser with a device for draining cleaned parts.

(3) Close the degreaser cover whenever parts are not being handled in the degreaser.

(4) Drain cleaned parts for at least fifteen (15) seconds or until dripping ceases;

(5) Provide a permanent, conspicuous label that lists the operating requirements in subdivisions (3), (4), (6), and (7).

(6) Store waste solvent only in closed containers.

(7) Prohibit the disposal or transfer of waste solvent in such a manner that could allow greater than twenty percent (20%) of the waste solvent (by weight) to evaporate into the atmosphere.

(b) Ensure the following additional control equipment and operating requirements are met:

(1) Equip the degreaser with one (1) of the following control devices if the solvent is heated to a temperature of greater than forty-eight and nine-tenths (48.9) degrees Celsius (one hundred twenty (120) degrees Fahrenheit):

(A) A freeboard that attains a freeboard ratio of seventy-five hundredths (0.75) or greater.
(B) A water cover when solvent used is insoluble in, and heavier than, water.
(C) A refrigerated chiller.
(D) Carbon adsorption.
(E) An alternative system of demonstrated equivalent or better control as those outlined in clauses (A) through (D) that is approved by the department. An alternative system shall be submitted to the U.S. EPA as a SIP revision.

(2) Ensure the degreaser cover is designed so that it can be easily operated with one (1) hand if the solvent is agitated or heated.

(3) If used, solvent spray:
(A) must be a solid, fluid stream; and
(B) shall be applied at a pressure that does not cause excessive splashing.

D.4.4 Material Requirements for Cold Cleaner Degreasers [326 IAC 8-3-8]

Pursuant to 326 IAC 8-3-8 (Material Requirements for Cold Cleaner Degreasers), the Permittee shall not operate a cold cleaning degreaser with a solvent that has a VOC composite partial vapor pressure that exceeds one (1) millimeter of mercury (nineteen-thousandths (0.019) pound per square inch) measured at twenty (20) degrees Celsius (sixty-eight (68) degrees Fahrenheit).

D.4.5 Preventive Maintenance Plan [326 IAC 2-7-5(12)]

A Preventive Maintenance Plan is required for these facilities. Section B - Preventive Maintenance Plan contains the Permittee's obligation with regard to the preventive maintenance plan required by this condition.

Record Keeping and Reporting Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

D.4.6 Record Keeping Requirements

(a) To document the compliance status with Condition D.4.4, the Permittee shall maintain the following records for each purchase of solvent used in the cold cleaner degreasing operations. These records shall be retained on-site or accessible electronically for the most recent three (3) year period and shall be reasonably accessible for an additional two (2) year period.

(1) The name and address of the solvent supplier.

(2) The date of purchase (or invoice/bill dates of contract servicer indicating service date).

(3) The type of solvent purchased.

(4) The total volume of the solvent purchased.

(5) The true vapor pressure of the solvent measured in millimeters of mercury at twenty (20) degrees Celsius (sixty-eight (68) degrees Fahrenheit).

(b) Section C - General Record Keeping Requirements contains the Permittee's obligations with regard to the records required by this condition.

SECTION E.1 NSPS

Emissions Unit Description:

(a) Stationary fire pump engines, including:

(3) One (1) 300-horsepower diesel-fired emergency fire pump engine, identified as FP3, constructed in 2006. Under 40 CFR 63, Subpart ZZZZ, FP3 is considered a new affected source. Under 40 CFR 60, Subpart IIII, FP3 is considered an affected facility.

(The information describing the process contained in this emissions unit description box is descriptive information and does not constitute enforceable conditions.)

New Source Performance Standards (NSPS) Requirements [326 IAC 2-7-5(1)]

E.1.1 General Provisions Relating to New Source Performance Standards [326 IAC 12-1] [40 CFR Part 60, Subpart A]

(a) Pursuant to 40 CFR 60.1, the Permittee shall comply with the provisions of 40 CFR Part 60, Subpart A – General Provisions, which are incorporated by reference as 326 IAC 12-1, for the emission unit(s) listed above, except as otherwise specified in 40 CFR Part 60, Subpart IIII.

(b) Pursuant to 40 CFR 60.4, the Permittee shall submit all required notifications and reports to:

Indiana Department of Environmental Management
Compliance and Enforcement Branch, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

E.1.2 Stationary Compression Ignition Internal Combustion Engines NSPS [326 IAC 12] [40 CFR Part 60, Subpart IIII]

The Permittee shall comply with the following provisions of 40 CFR Part 60, Subpart IIII (included as Attachment A to the operating permit), which are incorporated by reference as 326 IAC 12, for the emission unit(s) listed above:

(1) 40 CFR 60.4200(a)(2)(ii), (4)
(2) 40 CFR 60.4205(c)
(3) 40 CFR 60.4206
(4) 40 CFR 60.4207(b)
(5) 40 CFR 60.4208
(6) 40 CFR 60.4209(a)
(7) 40 CFR 60.4211(a), (b), (f)(1), (f)(2(i), (f)(3), (g)(2)
(8) 40 CFR 60.4214(b)
(9) 40 CFR 60.4218
(10) 40 CFR 60.4219
(11) Table 4 to Subpart IIII of Part 60
(12) Table 8 to Subpart IIII of Part 60

SECTION E.2 NESHAP

Emissions Unit Description:

(a) Stationary fire pump engines, including:

(1) One (1) 210-horsepower diesel-fired emergency fire pump engine, identified as FP1, constructed in 2003. Under 40 CFR 63, Subpart ZZZZ, FP1 is considered an existing affected source.

(2) One (1) 300-horsepower diesel-fired emergency fire pump engine, identified as FP2, constructed in 2003. Under 40 CFR 63, Subpart ZZZZ, FP2 is considered an existing affected source.

(3) One (1) 300-horsepower diesel-fired emergency fire pump engine, identified as FP3, constructed in 2006. Under 40 CFR 63, Subpart ZZZZ, FP3 is considered a new affected source. Under 40 CFR 60, Subpart IIII, FP3 is considered an affected facility.

(The information describing the process contained in this emissions unit description box is descriptive information and does not constitute enforceable conditions.)

National Emission Standards for Hazardous Air Pollutants (NESHAP) Requirements [326 IAC 2-7-5(1)]

E.2.1 General Provisions Relating to National Emission Standards for Hazardous Air Pollutants under 40 CFR Part 63 [326 IAC 20-1] [40 CFR Part 63, Subpart A]

(a) Pursuant to 40 CFR 63.1 the Permittee shall comply with the provisions of 40 CFR Part 63, Subpart A – General Provisions, which are incorporated by reference as 326 IAC 20-1, for the emission unit(s) listed above, except as otherwise specified in 40 CFR Part 63, Subpart ZZZZ.

(b) Pursuant to 40 CFR 63.10, the Permittee shall submit all required notifications and reports to:

Indiana Department of Environmental Management
Compliance and Enforcement Branch, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

E.2.2 Stationary Reciprocating Internal Combustion Engines NESHAP [40 CFR Part 63, Subpart ZZZZ] [326 IAC 20-82]

The Permittee shall comply with the following provisions of 40 CFR Part 63, Subpart ZZZZ (included as Attachment B to the operating permit). which are incorporated by reference as 326 IAC 20-82,

(a) The diesel fired emergency fire pump engines (FP1) and (FP2)
(1) 40 CFR 63.6580
(2) 40 CFR 63.6585
(3) 40 CFR 63.6590(a)(1)(iii) and (iv)
(4) 40 CFR 63.6595(a)(1), (b), and (c)
(5) 40 CFR 63.6603(a)
(6) 40 CFR 63.6605
(7) 40 CFR 63.6625(e)(3), (f), (h), and (i)

(8) 40 CFR 63.6640(a), (b), (e), (f)(1), (f)(2)(i), and (f)(4)
(9) 40 CFR 63.6645(a)(5)
(10) 40 CFR 63.6650
(11) 40 CFR 63.6655
(12) 40 CFR 63.6660
(13) 40 CFR 63.6665
(14) 40 CFR 63.6670
(15) 40 CFR 63.6675
(16) Table 2d (item 4)
(17) Table 6 (item 9)
(18) Table 8

(b) The diesel fired emergency fire pump (FP3):
(1) 40 CFR 63.6580
(2) 40 CFR 63.6585
(3) 40 CFR 63.6590(a)(2)(iii) and (c)(1)
(4) 40 CFR 63.6595(a)(6)
(5) 40 CFR 63.6665
(6) 40 CFR 63.6670
(7) 40 CFR 63.6675

SECTION E.3 NESHAP

Emissions Unit Description:

(f) A gasoline fuel transfer dispensing operation handling less than or equal to 1,300 gallons per day and less than 10,000 gallons per month, filling storage tanks having a capacity equal to or less than 10,500 gallons.

Under 40 CFR 63, Subpart CCCCCC, this is considered an existing affected source.

(The information describing the process contained in this emissions unit description box is descriptive information and does not constitute enforceable conditions.)

National Emission Standards for Hazardous Air Pollutants (NESHAP) Requirements [326 IAC 2-7-5(1)]

E.3.1 General Provisions Relating to National Emission Standards for Hazardous Air Pollutants under 40 CFR Part 63 [326 IAC 20-1] [40 CFR Part 63, Subpart A]

(a) Pursuant to 40 CFR 63.1 the Permittee shall comply with the provisions of 40 CFR Part 63, Subpart A – General Provisions, which are incorporated by reference as 326 IAC 20-1, for the emission unit(s) listed above, except as otherwise specified in 40 CFR Part 63, Subpart CCCCCC.

(b) Pursuant to 40 CFR 63.10, the Permittee shall submit all required notifications and reports to:

Indiana Department of Environmental Management
Compliance and Enforcement Branch, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

E.3.2 Source Category: Gasoline Dispensing Facilities NESHAP [40 CFR Part 63, Subpart CCCCCC]

The Permittee shall comply with the following provisions of 40 CFR Part 63, Subpart CCCCCC (included as Attachment C to the operating permit), for the emission unit(s) listed above:

(1) 40 CFR 63.11110
(2) 40 CFR 63.11111(a), (b), (e), (h), (i), (j), (k)
(3) 40 CFR 63.11112(a), (d)
(4) 40 CFR 63.11113(b), (c)
(5) 40 CFR 63.11115
(6) 40 CFR 63.11116
(7) 40 CFR 63.11130
(8) 40 CFR 63.11131
(9) 40 CFR 63.11132
(10) Table 3 to Subpart CCCCCC of Part 63

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
COMPLIANCE AND ENFORCEMENT BRANCH
PART 70 OPERATING PERMIT
CERTIFICATION

Source Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, Indiana 46221
Part 70 Permit No.: T097-42340-00042

This certification shall be included when submitting monitoring, testing reports/results or other documents as required by this permit.

Please check what document is being certified:

☐ Annual Compliance Certification Letter

☐ Test Result (specify) ____________________

☐ Report (specify) ____________________

☐ Notification (specify) ____________________

☐ Affidavit (specify) ____________________

☐ Other (specify) ____________________

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.
Signature:
Printed Name:
Title/Position:
Phone:
Date:

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
COMPLIANCE AND ENFORCEMENT BRANCH
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251
Phone: (317) 233-0178
Fax: (317) 233-6865

PART 70 OPERATING PERMIT
EMERGENCY OCCURRENCE REPORT

Source Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, Indiana 46221
Part 70 Permit No.: T097-42340-00042

This form consists of 2 pages **Page 1 of 2**

☐ This is an emergency as defined in 326 IAC 2-7-1(12)

- The Permittee must notify the Office of Air Quality (OAQ), within four (**4**) daytime business hours (1-800-451-6027 or 317-233-0178, ask for Compliance Section); and
- The Permittee must submit notice in writing or by facsimile within two (**2**) working days (Facsimile Number: 317-233-6865), and follow the other requirements of 326 IAC 2-7-16.

If any of the following are not applicable, mark N/A

Facility/Equipment/Operation:
Control Equipment:
Permit Condition or Operation Limitation in Permit:
Description of the Emergency:
Describe the cause of the Emergency:

If any of the following are not applicable, mark N/A **Page 2 of 2**

Date/Time Emergency started:
Date/Time Emergency was corrected:
Was the facility being properly operated at the time of the emergency? Y N
Type of Pollutants Emitted: TSP, PM-10, SO_2, VOC, NO_X, CO, Pb, other:
Estimated amount of pollutant(s) emitted during emergency:
Describe the steps taken to mitigate the problem:
Describe the corrective actions/response steps taken:
Describe the measures taken to minimize emissions:
If applicable, describe the reasons why continued operation of the facilities are necessary to prevent imminent injury to persons, severe damage to equipment, substantial loss of capital investment, or loss of product or raw materials of substantial economic value:

Form Completed by: ______________________________

Title / Position: ______________________________

Date: ______________________________

Phone:______________________________

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
COMPLIANCE AND ENFORCEMENT BRANCH

Part 70 Quarterly Report

Source Name:	Ingredion Incorporated Indianapolis Plant
Source Address:	1515 South Drover Street, Indianapolis, Indiana 46221
Part 70 Permit No.:	T097-42340-00042
Facility:	5549-1 and 5549-2
Parameter:	Combined input of starch
Limit:	The combined input of starch for units 5549-1 and 5549-2 shall not exceed 30,000 tons per twelve (12) consecutive month period, with compliance determined at the end of each month.

QUARTER:_____________________ YEAR:_____________________

Month	Column 1	Column 2	Column 1 + Column 2
	(Starch) (tons)	(Starch) (tons)	(Starch) (tons)
	This Month	Previous 11 Months	12 Month Total

☐ No deviation occurred in this quarter.
☐ Deviation/s occurred in this quarter.
Deviation has been reported on: ___________________

Submitted by: ____

Title / Position: ____

Signature: ____

Date: ____

Phone:____

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
COMPLIANCE AND ENFORCEMENT BRANCH

Part 70 Quarterly Report

Source Name:	Ingredion Incorporated Indianapolis Plant
Source Address:	1515 South Drover Street, Indianapolis, Indiana 46221
Part 70 Permit No.:	T097-42340-00042
Facility:	5502-1A, 5502-1B, 5502-1C, and 5502-1D
Parameter:	Total natural gas usage
Limit:	The combined input of natural gas to 5502-1A, 5502-1B, 5502-1C, and 5502-1D shall not exceed 1,263 million cubic feet (MMcf) per twelve (12) consecutive month period, with compliance determined at the end of each month.

QUARTER:____________________ YEAR:____________________

Month	Column 1	Column 2	Column 1 + Column 2
	(Natural Gas) (MMscf)	(Natural Gas) (MMscf)	(Natural Gas) (MMscf)
	This Month	Previous 11 Months	12 Month Total

☐ No deviation occurred in this quarter.
☐ Deviation/s occurred in this quarter.
Deviation has been reported on: ___________________

Submitted by: ____

Title / Position: ____

Signature: ____

Date: ____

Phone: ____

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
COMPLIANCE AND ENFORCEMENT BRANCH

Part 70 Quarterly Report

Source Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, Indiana 46221
Part 70 Permit No.: T097-42340-00042
Facility: 5549-13
Parameter: Input of starch
Limit: The input of starch to unit 5549-13 shall not exceed 14,010 tons per twelve (12) consecutive month period, with compliance determined at the end of each month.

QUARTER:____________________ YEAR:____________________

Month	Column 1	Column 2	Column 1 + Column 2
	(Starch) (tons)	(Starch) (tons)	(Starch) (tons)
	This Month	Previous 11 Months	12 Month Total

☐ No deviation occurred in this quarter.
☐ Deviation/s occurred in this quarter.
Deviation has been reported on: ____________________

Submitted by: ____________________

Title / Position: ____________________

Signature: ____________________

Date: ____________________

Phone:____________________

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
COMPLIANCE AND ENFORCEMENT BRANCH

Part 70 Quarterly Report

Source Name:	Ingredion Incorporated Indianapolis Plant
Source Address:	1515 South Drover Street, Indianapolis, Indiana 46221
Part 70 Permit No.:	T097-42340-00042
Facility:	40-3
Parameter:	Amount of starch produced
Limit:	The starch produced from unit 40-3 shall not exceed 127,000 tons per twelve (12) consecutive month period, with compliance determined at the end of each month.

QUARTER:____________________ YEAR:____________________

Month	Column 1	Column 2	Column 1 + Column 2
	(Starch) (tons)	(Starch) (tons)	(Starch) (tons)
	This Month	Previous 11 Months	12 Month Total

☐ No deviation occurred in this quarter.
☐ Deviation/s occurred in this quarter.
Deviation has been reported on: ____________________

Submitted by: ____________________

Title / Position: ____________________

Signature: ____________________

Date: ____________________

Phone: ____________________

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
COMPLIANCE AND ENFORCEMENT BRANCH
PART 70 OPERATING PERMIT
QUARTERLY DEVIATION AND COMPLIANCE MONITORING REPORT

Source Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, Indiana 46221
Part 70 Permit No.: T097-42340-00042

Months: ___________ to ____________ Year: ______________

Page 1 of 2

This report shall be submitted quarterly based on a calendar year. Proper notice submittal under Section B - Emergency Provisions satisfies the reporting requirements of paragraph (a) of Section C-General Reporting. Any deviation from the requirements of this permit, the date(s) of each deviation, the probable cause of the deviation, and the response steps taken must be reported. A deviation required to be reported pursuant to an applicable requirement that exists independent of the permit, shall be reported according to the schedule stated in the applicable requirement and does not need to be included in this report. Additional pages may be attached if necessary. If no deviations occurred, please specify in the box marked "No deviations occurred this reporting period".	
◻ NO DEVIATIONS OCCURRED THIS REPORTING PERIOD.	
◻ THE FOLLOWING DEVIATIONS OCCURRED THIS REPORTING PERIOD	
Permit Requirement (specify permit condition #)	
Date of Deviation:	**Duration of Deviation:**
Number of Deviations:	
Probable Cause of Deviation:	
Response Steps Taken:	
Permit Requirement (specify permit condition #)	
Date of Deviation:	**Duration of Deviation:**
Number of Deviations:	
Probable Cause of Deviation:	
Response Steps Taken:	

Page 2 of 2

Permit Requirement (specify permit condition #)	
Date of Deviation:	**Duration of Deviation:**
Number of Deviations:	
Probable Cause of Deviation:	
Response Steps Taken:	
Permit Requirement (specify permit condition #)	
Date of Deviation:	**Duration of Deviation:**
Number of Deviations:	
Probable Cause of Deviation:	
Response Steps Taken:	
Permit Requirement (specify permit condition #)	
Date of Deviation:	**Duration of Deviation:**
Number of Deviations:	
Probable Cause of Deviation:	
Response Steps Taken:	

Form Completed by:____

Title / Position: ____

Date:____

Phone: ____

Indiana Department of Environmental Management
Office of Air Quality

Addendum to the Technical Support Document (ATSD) for a Part 70 Significant Source Modification and Significant Permit Modification

Source Background and Description

Source Name:	**Ingredion, Inc.- Indianapolis Plant**
Source Location:	**1515 Drover St., Indianapolis, IN 46221**
County:	**Marion**
SIC Code:	**2046 (Wet Corn Milling)**
Operation Permit No.:	**T 097-42340-00042**
Operation Permit Issuance Date:	**October 6, 2020**
Significant Source Modification No.:	**097-43933-00042**
Significant Permit Modification No.:	**097-44166-00042**
Permit Reviewer:	**Taylor Wade**

On June 23, 2021, the Office of Air Quality (OAQ) had a notice posted on IDEM's website (https://www.in.gov/idem/public-notices/), stating that Ingredion, Inc.- Indianapolis Plant had applied for a significant source and permit modification to make the following changes at the source:

- The emission point identified as Unit 63-4 (CWS North Mill) is being removed along with the following associated equipment:
    - West Mill feed dust collector/baghouse
    - Surge hopper
    - VFD Screw
    - Wet Lump Eliminator
    - North Wet lump cyclone Wet lump Fan

  Existing ductwork from this removed unit will be re-routed through the existing Unit 63-5 (CWS North Product).

- The emission point identified as Unit 63-5 (CWS North Product) is being modified by removing the following associated equipment:
    - North Product hopper
    - Mill
    - Mill finished product conveyor
    - Mill recycle Cyclone

  A new replacement mill and North Surge hopper will be installed in place of the removed equipment. The existing baghouse for this unit has not changed and will continue to be used.

- The emission point identified as Unit 63-17 (CWS South Mill) is being modified by removing the following associated equipment:
    - Wet lump cyclone
    - Wet lump eliminator
    - Mill
    - Blower for South Product dust/collector/baghouse

A new replacement mill and South Product dust collector/baghouse blower will be installed in place of the removed equipment. The new blower will increase the airflow to the baghouse from 3,500 to 5,000 dscfm.

The notice also stated that the OAQ proposed to issue a significant source and permit modification for this operation and provided information on how the public could review the proposed permit and other documentation. Finally, the notice informed interested parties that there was a period of thirty (30) days to provide comments on whether or not this permit should be issued as proposed.

Additional Changes

IDEM, OAQ has decided to make additional revisions to the permit as described below, with deleted language as ~~strikeouts~~ and new language **bolded**.

(a) Unit descriptions have been updated and various grammatical errors have been fixed as follows:

A.2 Emission Units and Pollution Control Equipment Summary
[326 IAC 2-7-4(c)(3)][326 IAC 2-7-5(14)]

This stationary source consists of the following emission units and pollution control devices:

(a) One (1) natural gas-fired #1 Starch Flash Dryer, identified as unit 40-4, with a maximum heat input capacity of 30 ~~MMBtu/hr~~ **Million British Thermal Units per hour (MMBtu/hr)** and with a maximum air throughput of 42,200 dscfm, using a wet scrubber for particulate control, constructed in 1965 and modified in 1994, and exhausting to stack 40-4.

(l) One (1) natural gas-fired Regenerative Thermal Oxidizer **(RTO)**, identified as unit 5502-1D, with a maximum heat input capacity of 18 MMBtu/hr, used as a control for VOC, HAPs, and particulate, with a maximum air throughput of 45,148 dscfm, constructed in 1997, and exhausting to stack 5502-7.

Note: These changes have also been made in D.1.

D.1.7 Particulate, Sulfur Dioxide, HAPs, and VOC Control

***

(b) In order to assure compliance with Condition D.1.1(b), the first ~~(1st)~~ effect wash water system shall be in operation and control SO_2 emissions from unit 5502-1A at all times the unit is in operation.

D.3.2 Particulate Matter [326 IAC 6.5-1-2]

Pursuant to 326 IAC 6.5-1-2(a), particulate matter emissions from units 40-1A, 40-1B, 42-9, 42-11, 42-12, 42-13, 63-1A, 63-3, ~~63-4~~, 63-5, 63-9, 63-15, 63-16A, 63-16B, 63-17, 63-20, 71-3, 71-8, 152-1, 152-2, 152-4 through 152-12, 152-15, 577-1, 577-3, 577-4, 577-4A, 578-1, 578-2, 578-3, DC700, DC701, 5549-22, DC-31900, FA-60582, SH31913, TF31993, TF31992, TR31912, TR31913, TF31991, PAC-1, TF41818, TF41820, TF31980, TF31981, TF31982, TR31922, TR31923, TF31990, TF41822, TF34031, TF34032, TF34033, TF34034, TF31994, TF31983, TR31932, and TR31933, shall each not exceed 0.03 grain per dry standard cubic foot (gr/dscf).

D.3.5 Particulate Control

***

~~(c) In order to assure that the requirements of 326 IAC 2-2 (PSD) do not apply, the integral baghouse for particulate control shall be in operation and control emissions from the CWS North Product (63-5) at all times the CWS North Product (63-5) is in operation.~~

IDEM Contact

(a) If you have any questions regarding this permit, please contact Taylor Wade, Indiana Department Environmental Management, Office of Air Quality, Permits Branch, 100 North Senate Avenue, MC 61-53 IGCN 1003, Indianapolis, Indiana 46204-2251, or by telephone at (317) 233-0868 or (800) 451-6027, and ask for Taylor Wade or (317) 233-0868.

(b) A copy of the findings is available on the Internet at: http://www.in.gov/ai/appfiles/idem-caats/

(c) For additional information about air permits and how the public and interested parties can participate, refer to the IDEM Air Permits page on the Internet at: https://www.in.gov/idem/airpermit/public-participation/; and the Citizens' Guide to IDEM on the Internet at: https://www.in.gov/idem/resources/citizens-guide-to-idem/.

Indiana Department of Environmental Management
Office of Air Quality

Technical Support Document (TSD) for a Part 70 Significant Source Modification and Significant Permit Modification

Source Description and Location

Source Name:	**Ingredion, Inc.- Indianapolis Plant**
Source Location:	**1515 Drover St., Indianapolis, IN 46221**
County:	**Marion**
SIC Code:	**2046 (Wet Corn Milling)**
Operation Permit No.:	**T 097-42340-00042**
Operation Permit Issuance Date:	**October 6, 2020**
Significant Source Modification No.:	**097-43933-00042**
Significant Permit Modification No.:	**097-44166-00042**
Permit Reviewer:	**Taylor Wade**

Existing Approvals

The source was issued Part 70 Operating Permit Renewal No. 097-42340-00042 on October 6, 2020. There have been no subsequent approvals issued.

County Attainment Status

The source is located in Marion County.

Pollutant	Designation
SO_2	Attainment effective May 21, 2020, for the 2010 SO_2 standard for Center, Perry, and Wayne townships. Better than national standards for the remainder of the county.
CO	Attainment effective February 18, 2000, for the part of the city of Indianapolis bounded by 11th Street on the north; Capitol Avenue on the west; Georgia Street on the south; and Delaware Street on the east. Unclassifiable or attainment effective November 15, 1990, for the remainder of Indianapolis and Marion County.
O_3	Unclassifiable or attainment effective January 16, 2018, for the 2015 8-hour ozone standard.
$PM_{2.5}$	Unclassifiable or attainment effective April 15, 2015, for the 2012 annual $PM_{2.5}$ standard.
$PM_{2.5}$	Unclassifiable or attainment effective December 13, 2009, for the 2006 24-hour $PM_{2.5}$ standard.
PM_{10}	Unclassifiable effective November 15, 1990.
NO_2	Unclassifiable or attainment effective January 29, 2012, for the 2010 NO_2 standard.
Pb	Unclassifiable or attainment effective December 31, 2011, for the 2008 lead standard.

(a) Ozone Standards
Volatile organic compounds (VOC) and Nitrogen Oxides (NO_x) are regulated under the Clean Air Act (CAA) for the purposes of attaining and maintaining the National Ambient Air Quality Standards (NAAQS) for ozone. Therefore, VOC and NO_x emissions are considered when evaluating the rule applicability relating to ozone. Marion County has been designated as attainment or unclassifiable for ozone. Therefore, VOC and NO_x emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2.

(b) $PM_{2.5}$
Marion County has been classified as attainment for $PM_{2.5}$. Therefore, direct $PM_{2.5}$, SO_2, and NOx emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2.

(c) Other Criteria Pollutants
Marion County has been classified as attainment or unclassifiable in Indiana for all the other criteria pollutants. Therefore, these emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2.

Fugitive Emissions

Since this type of operation is not one (1) of the twenty-eight (28) listed source categories under 326 IAC 2-2-1(ff)(1), 326 IAC 2-3-2(g), or 326 IAC 2-7-1(22)(B), and there is no applicable New Source Performance Standard or National Emission Standard for Hazardous Air Pollutants that was in effect on August 7, 1980, fugitive emissions are not counted toward the determination of PSD, Emission Offset, and Part 70 Permit applicability.

The fugitive emissions of hazardous air pollutants (HAP) are counted toward the determination of Part 70 Permit applicability and source status under Section 112 of the Clean Air Act (CAA).

Greenhouse Gas (GHG) Emissions

On June 23, 2014, in the case of *Utility Air Regulatory Group v. EPA*, cause no. 12-1146, (available at http://www.supremecourt.gov/opinions/13pdf/12-1146_4g18.pdf) the United States Supreme Court ruled that the U.S. EPA does not have the authority to treat greenhouse gases (GHGs) as an air pollutant for the purpose of determining operating permit applicability or PSD Major source status. On July 24, 2014, the U.S. EPA issued a memorandum to the Regional Administrators outlining next steps in permitting decisions in light of the Supreme Court's decision. U.S. EPA's guidance states that U.S. EPA will no longer require PSD or Title V permits for sources "previously classified as 'Major' based solely on greenhouse gas emissions."

The Indiana Environmental Rules Board adopted the GHG regulations required by U.S. EPA at 326 IAC 2-2-1(zz), pursuant to Ind. Code § 13-14-9-8(h) (Section 8 rulemaking). A rule, or part of a rule, adopted under Section 8 is automatically invalidated when the corresponding federal rule, or part of the rule, is invalidated. Due to the United States Supreme Court Ruling, IDEM, OAQ cannot consider GHG emissions to determine operating permit applicability or PSD applicability to a source or modification.

Source Status - Existing Source

The table below summarizes the potential to emit of the entire source, prior to the proposed modification, after consideration of all enforceable limits established in the effective permits. If the control equipment has been determined to be integral, the table reflects the potential to emit (PTE) after consideration of the integral control device.

	Source-Wide Emissions Prior to Modification (ton/year)								
	PM[1]	PM_{10}[1]	$PM_{2.5}$[1, 2]	SO_2	NO_X	VOC	CO	Single HAP[3]	Total HAPs
Total PTE of Entire Source Excluding Fugitive Emissions*	607.20	702.60	747.50	45.20	189.50	44.80	170.70	9.80	24.74

	Source-Wide Emissions Prior to Modification (ton/year)								
	PM[1]	PM_{10}[1]	$PM_{2.5}$[1, 2]	SO_2	NO_X	VOC	CO	Single HAP[3]	Total HAPs
Title V Major Source Thresholds	NA	100	100	100	100	100	100	10	25
PSD Major Source Thresholds	250	250	250	250	250	250	250	--	--
Emission Offset Major Source Thresholds	---	NA	NA	NA	NA	NA	NA	--	--

[1]Under the Part 70 Permit program (40 CFR 70), PM_{10} and $PM_{2.5}$, not particulate matter (PM), are each considered as a "regulated air pollutant."
[2]$PM_{2.5}$ listed is direct $PM_{2.5}$.
[3]Single highest source-wide HAP
*Fugitive HAP emissions are always included in the source-wide emissions.

(a) This existing source is a major stationary source, under PSD (326 IAC 2-2), because a PSD regulated pollutant(s), PM, PM_{10} and $PM_{2.5}$ is emitted at a rate of 250 tons per year or more, and it is not one of the twenty-eight (28) listed source categories, as specified in 326 IAC 2-2-1(ff)(1).

(b) This existing source is not a major source of HAP, as defined in 40 CFR 63.2, because HAP emissions are less than ten (10) tons per year for any single HAP and less than twenty-five (25) tons per year of a combination of HAPs.

(c) These emissions are based on the TSD of Renewal No. T097-42340-00042, issued on October 6, 2020.

Description of Proposed Modification

The Office of Air Quality (OAQ) has reviewed an application, submitted by Ingredion, Inc. on March 30, 2021, relating to the following changes at the source.

- The emission point identified as Unit 63-4 (CWS North Mill) is being removed along with the following associated equipment:
  - West Mill feed dust collector/baghouse
  - Surge hopper
  - VFD Screw
  - Wet Lump Eliminator
  - North Wet lump cyclone Wet lump Fan

  Existing ductwork from this removed unit will be re-routed through the existing Unit 63-5 (CWS North Product).

- The emission point identified as Unit 63-5 (CWS North Product) is being modified by removing the following associated equipment:
  - North Product hopper
  - Mill
  - Mill finished product conveyor
  - Mill recycle Cyclone

  A new replacement mill and North Surge hopper will be installed in place of the removed equipment. The existing baghouse for this unit has not changed and will continue to be used.

- The emission point identified as Unit 63-17 (CWS South Mill) is being modified by removing the following associated equipment:

  - Wet lump cyclone
  - Wet lump eliminator
  - Mill
  - Blower for South Product dust/collector/baghouse

A new replacement mill and South Product dust collector/baghouse blower will be installed in place of the removed equipment. The new blower will increase the airflow to the baghouse from 3,500 to 5,000 dscfm.

The following is a list of the modified emission units and pollution control device(s):

(a) One (1) CWS South Mill, identified as unit 63-17, constructed in 1977, approved in 2021 for modification, with a maximum throughput of 0.8 tons/hr, using a baghouse** (replaced baghouse in 2008) for particulate control, and exhausting to stack 53.

(b) One (1) CWS North Product, identified as unit 63-5, constructed prior to 1974, approved in 2021 for modification, with a maximum throughput of 2.5 tons/hr, using a baghouse* for particulate control, and exhausting to stack 49.

As part of this permitting action, the following emission units are being removed the permit:

(c) One (1) CWS North Mill, identified as unit 63-4, with a maximum throughput of 2.5 tons/hr, using a baghouse* for particulate control, constructed prior to 1974, and exhausting to stack 48.

"Integral Part of the Process" Determination

The source submitted the following information to justify why the baghouse should be considered an integral part of the CWS North Product (63-5):

(a) The source claims that the primary operation for the baghouse is not for pollution control, but as a material (starch) recovery unit. Product Bins are used to store dry starch prior to conversion to a salable product and this baghouse is specifically used to collect and recycle valuable raw material back into the process. The source has provided the following economic analysis to justify why collecting the raw material also provides a significant economic benefit for the source.

Maximum Product Throughput (per bin)[1] *ton/hr*	**Uncontrolled Emission Factor** *(lb/ton)**	**Product Lost as PM** *lb/hr*	**Product Lost as PM (uncontrolled PTE)** *ton/hr*	**Filter Control Efficiency[3]** *%*	**Product Recovered by Bin Vent Filters** *ton/hr*
2.50	3.14	7.85	0.0039	99.00%	0.0039

Initial Investment		
Baghouse (including assoc. ducts and installation)	$	69,000.00
Projected Total Investment Costs (P):	$	69,000.00
Projected Lifetime of Equipment (years), (N)		10 years
Interest Rate (%), (i)		10%
Projected Total Investment Annualized Over 10 years (A):	**$**	**11,229**

$A = P[(i(1+i)^N)/((1+i)^N-1)]$		
Maintenance/Operations		
Filter Replacement Cost ($40/bag, 80 total bags)	$	3,200.00
Estimated operating cost at $0.30 /hr (based on air usage bag pulsing and blowdowns, energy usage of fans)	$	2,628.00
Projected Total Annual Maintenance/Operations Costs:	$	**5,828.00**
Projected Total Annualized Costs:	$	**17,057.00**
Product Savings		
Product emitted to baghouse per year*	Lbs/yr	68,766
Percent of media captured in process	%	99
Estimated amount of recovered starch:	Lbs/yr	68,078
Value of recovered starch	$/lb	0.70
Total Value of recovered starch (per year)	$	47,654.84
Minus Total Annual Maintenance/Operations Cost	$	17,057.00
Projected Total Annual Product Savings:	$	**30,597.84**
*Baghouse operates 3 shifts/day, 7 days/week		

IDEM, OAQ evaluated the information submitted and agrees that the baghouse should be considered an integral part of the CWS North Product (63-5). Therefore, the potential to emit PM, PM_{10}, and $PM_{2.5}$ from the CWS North Product (63-5) was calculated after the baghouse for purposes of determining permitting level and applicability of 326 IAC 2-2 and 326 IAC 6.5.. Operating conditions in the proposed permit will specify that this baghouse shall operate at all times the CWS North Product (63-5) is in operation.

The source submitted the following information to justify why the baghouse should be considered an integral part of the CWS South Mill (63-17):

(a) The source claims that the primary operation for the baghouse is not for pollution control, but as a material (starch) recovery unit. Product Bins are used to store dry starch prior to conversion to a salable product and this baghouse is specifically used to collect and recycle valuable raw material back into the process. The source has provided the following economic analysis to justify why collecting the raw material also provides a significant economic benefit for the source.

Maximum Product Throughput (per bin) *ton/hr*	**Uncontrolled Emission Factor** (lb/ton)	**Product Lost as PM** *lb/hr*	**Product Lost as PM (uncontrolled PTE)** *ton/hr*	**Filter Control Efficiency** %	**Product Recovered by Bin Vent Filters** *ton/hr*
0.80	3.14	2.51	1.26E-03	99.00%	1.24E-03

Emission factor from AP 42 Chapter 11.12 Table 11.12-2 Concrete Batching

Initial Investment		
Baghouse (including assoc. ducts and installation)	$	69,000.00
Projected Total Investment Costs (P):	$	69,000.00
Projected Lifetime of Equipment (years), (N)		10 years
Interest Rate (%), (i)		10%
Projected Total Investment Annualized Over 10 years (A): $A = P[(i(1+i)^N)/((1+i)^N-1)]$	**$**	**11,229**

Maintenance/Operations		
Filter Replacement Cost ($40/bag, 86 total bags)	$	3,440.00
Estimated operating cost at $0.30 /hr (based on air usage bag pulsing and blowdowns, energy usage of fans)	$	2,628.00
Projected Total Annual Maintenance/Operations Costs:	$	**6,068.00**
Projected Total Annualized Costs:	$	**17,297.00**
Product Savings		
Product emitted to baghouse per year *	lbs	22,005.12
Percent of media captured in process	%	99
Estimated amount of recovered starch:	lbs	21,785.07
Value of recovered starch	$/lb	0.70
Total Value of recovered starch (per year)	$	15,249.58
Minus Total Annual Maintenance/Operations Cost	$	17,297.00
Projected Total Annual Product Savings:	$	**0.00**
*Baghouse operates 3 shifts/day, 7 days/week		

IDEM, OAQ evaluated the information submitted and has determined that the baghouse should not be considered an integral part of the CWS South Mill (63-17). This determination is based on the fact that there is not a significant economic benefit from capturing emissions at this emission unit. Therefore, the potential to emit PM, PM_{10}, and $PM_{2.5}$ from the CWS South Mill (63-17) was calculated before the baghouse for purposes of determining permitting level and applicability of 326 IAC 2-2 and 326 IAC 6.5.

Enforcement Issues

There are no pending enforcement actions related to this modification.

Emission Calculations

See Appendix A of this Technical Support Document for detailed emission calculations.

Permit Level Determination – Part 70 Modification to an Existing Source

Pursuant to 326 IAC 2-1.1-1(12), Potential to Emit is defined as “the maximum capacity of a stationary source or emission unit to emit any air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or type or amount of material combusted, stored, or processed shall be treated as part of its design if the limitation is enforceable by the U. S. EPA, IDEM, or the appropriate local air pollution control agency.”

The following table is used to determine the appropriate permit level under 326 IAC 2-7-10.5. This table reflects the PTE before controls. If the control equipment has been determined to be integral, the table reflects the potential to emit (PTE) after consideration of the integral control device.

	PTE Before Controls of the New Emission Units (ton/year)							
Process / Emission Unit	**PM**	**PM_{10}**	**$PM_{2.5}$[1]**	**SO_2**	**NO_X**	**VOC**	**CO**	**Total HAPs**
CWS South Mill (63-17)	563.14	563.14	563.14	0.00	0.00	0.00	0.00	0.00
CWS North Product (63-5)	7.88	7.88	7.88	0.00	0.00	0.00	0.00	0.00

	PTE Before Controls of the New Emission Units (ton/year)							
Process / Emission Unit	**PM**	**PM_{10}**	**$PM_{2.5}$[1]**	**SO_2**	**NO_X**	**VOC**	**CO**	**Total HAPs**
Total PTE Increase of the Modified Emission Unit(s)/Process	**571.03**	**571.03**	**571.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
[1]$PM_{2.5}$ listed is direct $PM_{2.5}$. [2]Single highest HAP. *Baghouses for unit 63-5 have been determined to be integral to their process.								

Appendix A of this TSD reflects the detailed potential emissions of the modification.

(a) Approval to Construct

Pursuant to 326 IAC 2-7-10.5(g)(4), a Significant Source Modification is required because this modification has the potential to emit PM/PM10/direct PM2.5 at equal to or greater than twenty-five (25) tons per year.

(b) Approval to Operate

Pursuant to 326 IAC 2-7-12(d)(1), this change to the permit is being made through a Significant Permit Modification because this modification does not qualify as a Minor Permit Modification or as an Administrative Amendment.

Permit Level Determination – PSD Emissions Increase

(a) Actual to Projected Actual (ATPA) Applicability Test
Since this project only involves existing emissions units, an Actual to Projected Actual (ATPA) test, specified in 326 IAC 2-2-2(d)(3), is used to determine if the project results in a Significant Emissions Increase.

The source has provided information and emission calculations as part of the application for this ATPA test. IDEM, OAQ reviewed the emission calculations provided by the source to verify the emissions factors and methodology used, but has not made any determination regarding the validity and accuracy of certain information such as actual throughput, actual usage and actual hours of operation.

(b) Existing Emissions Units Affected by the Modification
This project only involves existing emissions units affected by the modification. The following emissions units will be considered existing for the purpose of this ATPA test:

(1) Modified emissions units.

The following emissions unit(s) will be considered as modified existing emissions units for this evaluation.

(1) One (1) CWS South Mill, identified as unit 63-17, constructed in 1977, approved in 2021 for modification, with a maximum throughput of 0.8 tons/hr, using a baghouse** (replaced baghouse in 2008) for particulate control, and exhausting to stack 53.

(2) One (1) CWS North Product, identified as unit 63-5, with a maximum throughput of 2.5 tons/hr, using a baghouse* for particulate control, constructed prior to 1974 and approved in 2021 for modification, and exhausting to stack 49.

(c) Baseline Actual Emissions

The baseline actual emissions from the existing emissions units involved in this ATPA applicability test are based on their emissions from 2012 through 2013.

(d) Actual to Projected Actual (ATPA) Summary
The Emissions Increase of the project is the sum of the difference between the Projected Actual Emissions and the baseline emissions for **each existing emissions unit.**

ATPA $_{(existing\ unit)}$ = Projected Actual Emissions - Baseline Emissions

See Appendix A of this Technical Support Document for detailed emission calculations.

Existing Emissions Unit ATPA (tons/year)							
Process/Emissions Unit	**PM**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**NO_X**	**VOC**	**CO**
CWS South Mill (63-17)							
Projected Actual Emissions	5.63	5.63	5.63	0.00	0.00	0.00	0.00
Baseline Actual Emissions	5.08	5.08	5.08	0.00	0.00	0.00	0.00
ATPA	**0.55**	**0.55**	**0.55**	**0.00**	**0.00**	**0.00**	**0.00**

Existing Emissions Unit ATPA (tons/year)							
Process/Emissions Unit	**PM**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**NO_X**	**VOC**	**CO**
CWS North Product (63-5)							
Projected Actual Emissions	7.88	7.88	7.88	0.00	0.00	0.00	0.00
Baseline Actual Emissions	3.86	3.86	3.86	0.00	0.00	0.00	0.00
ATPA	**4.02**	**4.02**	**4.02**	**0.00**	**0.00**	**0.00**	**0.00**

Project Emissions Increase (tons/year)							
Process/Emissions Unit	**PM**	**PM_{10}**	**$PM_{2.5}$***	**SO_2**	**NO_X**	**VOC**	**CO**
CWS South Mill (63-17)	0.55	0.55	0.55	0.00	0.00	0.00	0.00
CWS North Product (63-5)	4.02	4.02	4.02	0.00	0.00	0.00	0.00
Project Emissions Increase	**4.58**	**4.58**	**4.58**	**0.00**	**0.00**	**0.00**	**0.00**
Significant Levels	25	15	10	40	40	40	100
*PM2.5 listed is direct PM2.5.							

The source has stated that no upstream or downstream emission units will be affected by this modification.

(e) Conclusion
The Permittee has provided information as part of the application for this approval that based on Actual to Projected Actual test in 326 IAC 2-2-2 that this modification to an existing major PSD stationary source will not be major because the Emissions Increase of each PSD regulated pollutant is less than the PSD significant levels levels (i.e., the modification does not cause a

Significant Emissions Increase). The applicant will be required to keep records and report in accordance with 326 IAC 2-2-8 (Prevention of Significant Deterioration (PSD) Requirements: Source Obligation).

PTE of the Entire Source After Issuance of the Part 70 Modification

The table below summarizes the after issuance source-wide potential to emit, reflecting all limits, of the emission units. Any control equipment is considered federally enforceable only after issuance of the Part 70 source and permit modification, and only to the extent that the effect of the control equipment is made practically enforceable in the permit. If the control equipment has been determined to be integral, the table reflects the potential to emit (PTE) after consideration of the integral control device.

	Source-Wide Emissions After Issuance (ton/year)								
	PM[1]	**PM_{10}[1]**	**$PM_{2.5}$[1, 2]**	**SO_2**	**NO_X**	**VOC**	**CO**	**Single HAP[3]**	**Total HAPs**
Total PTE of Entire Source Excluding Fugitives*	601.50	697.00	741.90	45.20	189.50	44.80	170.70	9.80	24.74
Title V Major Source Thresholds	NA	100	100	100	100	100	100	10	25
PSD Major Source Thresholds	250	250	250	250	250	250	250	--	--

[1]Under the Part 70 Permit program (40 CFR 70), PM_{10} and $PM_{2.5}$, not particulate matter (PM), are each considered as a "regulated air pollutant."
[2]$PM_{2.5}$ listed is direct $PM_{2.5}$.
[3]Single highest source-wide HAP
*Fugitive HAP emissions are always included in the source-wide emissions.

(a) This existing major PSD stationary source will continue to be major under 326 IAC 2-2 because at least one pollutant, PM, PM_{10}, $PM_{2.5}$ has emissions equal to or greater than the PSD major source threshold.

(b) This existing area source of HAP will continue to be an area source of HAP, as defined in 40 CFR 63.2, because HAP emissions will continue to be less than ten (10) tons per year for any single HAP and less than twenty-five (25) tons per year of a combination of HAPs. Therefore, this source is an area source under Section 112 of the Clean Air Act (CAA).

Federal Rule Applicability Determination

Due to the modification at this source, federal rule applicability has been reviewed as follows:

New Source Performance Standards (NSPS):

(a) There are no New Source Performance Standards (NSPS) (326 IAC 12 and 40 CFR Part 60) included in the permit for this proposed modification.

National Emission Standards for Hazardous Air Pollutants (NESHAP):

(b) There are no National Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR Part 63, 326 IAC 14, and 326 IAC 20) included in the permit for this proposed modification.

Compliance Assurance Monitoring (CAM):

(a) Pursuant to 40 CFR 64.2, Compliance Assurance Monitoring (CAM) is applicable to each pollutant-specific emission unit that meets the following criteria:

(1) has a potential to emit before controls equal to or greater than the major source threshold for the regulated pollutant involved;

(2) is subject to an emission limitation or standard for that pollutant (or a surrogate thereof); and

(3) uses a control device, as defined in 40 CFR 64.1, to comply with that emission limitation or standard.

(b) Pursuant to 40 CFR 64.2(b)(1)(i), emission limitations or standards proposed after November 15, 1990 pursuant to a NSPS or NESHAP under Section 111 or 112 of the Clean Air Act are exempt from the requirements of CAM. Therefore, an evaluation was not conducted for any emission limitations or standards proposed after November 15, 1990 pursuant to a NSPS or NESHAP under Section 111 or 112 of the Clean Air Act.

The following table is used to identify the applicability of CAM to new and modified emission unit and each emission limitation or standard for a specified pollutant based on the criteria specified under 40 CFR 64.2:

Emission Unit/Pollutant	Control Device	Applicable Emission Limitation	Uncontrolled PTE (tons/year)	Controlled PTE (tons/year)	CAM Applicable (Y/N)	Large Unit (Y/N)
CWS North Product (63-5)/ PM, PM_{10}, $PM_{2.5}$	BH	326 IAC 6.5	-	-	N [1]	N
CWS South Mill (63-17)/ PM, PM_{10}, $PM_{2.5}$	BH	326 IAC 6.5	-	-	N [1]	N

Under the Part 70 Permit program (40 CFR 70), PM is not a regulated air pollutant.

Uncontrolled PTE (tpy) and controlled PTE (tpy) are evaluated against the Major Source Threshold for each pollutant. Major Source Threshold for regulated air pollutants (PM10, PM2.5, SO2, NOx, VOC and CO) is 100 tpy, for a single HAP ten (10) tpy, and for total HAPs twenty-five (25) tpy.

N [1] Pursuant to 40 CFR Part 64.1, the control devices are considered to be inherent process equipment. Therefore, based on the evaluation, the requirements of 40 CFR Part 64, CAM, are not applicable.

Controls: BH = Baghouse, C = Cyclone, DC = Dust Collection System, RTO = Regenerative or Recuperative Thermal Oxidizer, WS = Wet Scrubber, ESP = Electrostatic Preciptator

Emission units without air pollution controls are not subject to CAM. Therefore, they are not listed.

Inherent Process Equipment
Pursuant to 40 CFR Part 64.1, the definition of inherent process equipment is "equipment that is necessary for the proper or safe functioning of the process, or material recovery equipment that the owner or operator documents is installed and operated primarily for purposes other than compliance with air pollution regulations. Equipment that must be operated at an efficiency higher than that achieved during normal process operations in order to comply with the applicable emission limitation or standard is not inherent process equipment. For the purposes of this part, inherent process equipment is not considered subject to CAM."

Based on this evaluation, the requirements of 40 CFR Part 64, CAM, are not applicable to any of the modified units as part of this modification.

State Rule Applicability - Entire Source

Due to this modification, state rule applicability has been reviewed as follows:

326 IAC 2-2 (PSD) and 326 IAC 2-3 (Emission Offset)
PSD and Emission Offset applicability is discussed under the Permit Level Determination - PSD Emissions Increase of this document.

326 IAC 2-4.1 (Major Sources of Hazardous Air Pollutants (HAP))
The provisions of 326 IAC 2-4.1 apply to any owner or operator who constructs or reconstructs a major source of hazardous air pollutants (HAP), as defined in 40 CFR 63.41, after July 27, 1997, unless the major source has been specifically regulated under or exempted from regulation under a NESHAP that was issued pursuant to Section 112(d), 112(h), or 112(j) of the Clean Air Act (CAA) and incorporated under 40 CFR 63. On and after June 29, 1998, 326 IAC 2-4.1 is intended to implement the requirements of Section 112(g)(2)(B) of the Clean Air Act (CAA).

The operation of this source will emit less than ten (10) tons per year for a single HAP and less than twenty-five (25) tons per year for a combination of HAPs. Therefore, 326 IAC 2-4.1 does not apply.

State Rule Applicability – Individual Facilities

Due to this modification, state rule applicability has been reviewed as follows:

CWS North Product (63-5)
326 IAC 6-3-2 (Particulate Emission Limitations for Manufacturing Processes)
Pursuant to 326 IAC 6-3-1(c)(3), the CWS North Product (63-5) is not subject to the requirements of 326 IAC 6-3, since the source is subject to a more stringent particulate limitation in 326 IAC 6.5.

326 IAC 6.5 PM Limitations Except Lake County
This source is subject to the requirements of 326 IAC 6.5-1-2. Therefore, pursuant to 6.5-1-2(a), PM emissions from the CWS North Product (63-5) shall not exceed seven hundredths (0.07) gram per dry standard cubic meter (g/dscm) (three-hundredths (0.03) grain per dry standard cubic foot (dscf)).

CWS South Mill (63-17)
326 IAC 6-3-2 (Particulate Emission Limitations for Manufacturing Processes)
Pursuant to 326 IAC 6-3-1(c)(3), the CWS South Mill (63-17) is not subject to the requirements of 326 IAC 6-3, since the source is subject to a more stringent particulate limitation in 326 IAC 6.5.

326 IAC 6.5 PM Limitations Except Lake County
This source is subject to the requirements of 326 IAC 6.5-1-2. Therefore, pursuant to 6.5-1-2(a), PM emissions from the CWS South Mill (63-17) shall not exceed seven hundredths (0.07) gram per dry standard cubic meter (g/dscm) (three-hundredths (0.03) grain per dry standard cubic foot (dscf)).

Compliance Determination and Monitoring Requirements

(a) The Compliance Determination Requirements applicable to this modification are as follows:

Testing Requirements:

(1) IDEM OAQ has determined that testing of the baghouses is not required at this time to determine compliance with emission limits. IDEM has the authority to require testing at a later time if necessary to demonstrate compliance with any applicable requirement.

(b) The Compliance Monitoring Requirements applicable to this proposed modification are as follows:

Emission Unit (Control Device)(	Type of Parametric Monitoring	Frequency	Range or Specification
CWS South Mill-63-17 (Baghouse)	Visible emission notations	Daily	Verify whether emissions are normal or abnormal

Proposed Changes

As part of this permit approval, the permit may contain new or different permit conditions and some conditions from previously issued permits/approvals may have been corrected, changed, or removed. These corrections, changes, and removals may include Title I changes.

The following changes listed below are due to the proposed modification. Deleted language appears as ~~strikethrough~~ text and new language appears as **bold** text (these changes may include Title I changes):

(1) The descriptions of units 63-17 and 63-5 have been updated in sections A.2 and D.3 of the permit.

(2) The descriptions of other units not affected by this modification have been updated throughout the A and D permit sections for general cleanup to indicate construction year.

(3) Particulate limits to render the requirements of 326 IAC 2-2 not applicable to unit 63-17 have been added to section D.3.1.

A.2 Emission Units and Pollution Control Equipment Summary
[326 IAC 2-7-4(c)(3)][326 IAC 2-7-5(14)]

This stationary source consists of the following emission units and pollution control devices:

***

(oo) Grinding and machining operations controlled with fabric filters with a design grain loading of less than or equal to 0.03 grains per actual cubic foot and a gas flow rate less than or equal to 4000 actual cubic feet per minute, including the following: deburring, buffing, polishing, abrasive blasting, pneumatic conveying, and woodworking operations:

(15) One (1) CWS South Mill, identified as unit 63-17, constructed in 1977, **approved in 2021 for modification**, with a maximum throughput of 0.8 tons/hr, using a baghouse** (replaced baghouse in 2008) for particulate control, and exhausting to stack 53.

(qq) Starch operations, starch drying, starch handling and starch packaging consisting of the following units:

(2) One (1) Mixer 1 baghouse, identified as 152-2, with a maximum air throughput of 1,000 dscfm, using a baghouse* for particulate control, constructed in 2002 and ~~approved in 2011 for modification~~ **modified in 2011**, and exhausting to stack 152-2.

***

~~(25) One (1) CWS North Mill, identified as unit 63-4, with a maximum throughput of 2.5 tons/hr, using a baghouse* for particulate control, constructed prior to 1974, and exhausting to stack 48.~~

(**25**~~6~~) One (1) CWS North Product, identified as unit 63-5, with a maximum throughput of 2.5 tons/hr, using a baghouse* for particulate control, constructed prior to 1974 **and approved in 2021 for modification**, and exhausting to stack 49.

(54) Three (3) Base Bins (80, 81, and 82), identified as units TF31980, TF31981, and TF31982, respectively, each with a maximum air throughput of 1,275 dscfm, using product recovery DC31980*, DC31981*, and DC31982*, respectively, for particulate control, ~~approved in 2015 for construction~~ **constructed in 2016**, and exhausting to stacks 10-158, 11-158, and 12-158.

(55) One (1) FBR2 Exhaust, identified as unit TR31922, with a maximum air throughput of 6,000 dscfm, using product recovery metal filters* for particulate control, ~~approved in 2015 for construction~~ **constructed in 2016**, and exhausting to stack 14-158.

(56) One (1) FBR2 Cooling Reactor, identified as unit TR31923, with a maximum air throughput of 4,300 dscfm, using product recovery metal filters* for particulate control, approved in 2015 for construction, and exhausting to stack 15-158.

(57) One (1) Product Bin 90, identified as unit TF31990, using product recovery DC31990* for particulate control, with a maximum air throughput of 2,200 dscfm, ~~approved in 2015 for construction~~ **constructed in 2016**, and exhausting to stack 13-158.

(59) One (1) DSW Product Silo, identified as unit TF34031, ~~approved in 2018 for construction~~ **constructed in 2019**, with a maximum storage capacity of 45 tons and a maximum throughput of 1.75 tons per hour, using filter DC34031 for particulate control, exhausting to stack S34031.

(60) One (1) DSW Product Silo, identified as unit TF34032, ~~approved in 2018 for construction~~ **constructed in 2019**, with a maximum storage capacity of 45 tons and a maximum throughput of 1.75 tons per hour, using filter DC34032 for particulate control, exhausting to stack S34032.

(61) One (1) DSW Product Silo, identified as unit TF34033, ~~approved in 2018 for construction~~ **constructed in 2019**, with a maximum storage capacity of 45 tons and a maximum throughput of 1.75 tons per hour, using filter DC34033 for particulate control, exhausting to stack S34033.

(62) One (1) DSW Product Silo, identified as unit TF34034, ~~approved in 2018 for construction~~ **constructed in 2019**, with a maximum storage capacity of 45 tons and a maximum throughput of 1.75 tons per hour, using filter DC34034 for particulate control, exhausting to stack S34034.

A.3 Specifically Regulated Insignificant Activities
[326 IAC 2-7-1(21)][326 IAC 2-7-4(c)][326 IAC 2-7-5(14)]

This stationary source also includes the following insignificant activities which are specifically regulated, as defined in 326 IAC 2-7-1(21):

***

(b) Combustion related activities including spaces heaters, process heaters, or boilers using natural gas-fired with heat input equal to or less than ten million (10,000,000) British thermal units per hour:

(2) One (1) natural gas-fired FBR2 Burner, identified as unit FH31924, with a maximum capacity of 3.0 MMBtu/hr, ~~approved in 2015 for construction~~ **constructed in 2016**, and exhausting to stack 16-158.

(3) Two (2) natural gas-fired Air Heater Burners, identified as Air Heater 1 and Air Heater 2, units EF31926A and EF31927A, respectively, ~~approved in 2015 for construction~~ **constructed in 2016**, each with a maximum heat input capacity of 0.4 MMBtu/hr, and exhausting to stacks 17-158 and 18-158.

* *The description changes above have also been reflected in the respective section D of the permit.*

D.3.1 PSD and Emission Offset Minor Limits [326 IAC 2-2][326 IAC 2-3]

***

(e) Pursuant to SSM No. 097-43933-00042, and in order to render the requirements of 326 IAC 2-2 (PSD) not applicable, the PM, PM10, and PM2.5 emissions shall be less than the emission limits listed in the table below:

Unit Number	Stack ID	PM Emission Limit (lb/hr)	PM10 Emission Limit (lb/hr)	PM2.5 Emission Limit (lb/hr)
63-17	53	5.63	5.63	5.63

Compliance with these limits will limit the emissions increase of the modification to less than twenty-five (25) tons of PM, fifteen (15) tons of PM10, and ten (10) tons of PM2.5 per twelve (12) consecutive month period and shall render the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) not applicable to the 2021 Modification.

Conclusion and Recommendation

Unless otherwise stated, information used in this review was derived from the application and additional information submitted by the applicant. An application for the purposes of this review was received on March 30, 2021.

The construction of this proposed modification shall be subject to the conditions of the attached proposed Part 70 Significant Source Modification No. 097-43933-00042. The operation of this proposed modification shall be subject to the conditions of the attached proposed Significant Permit Modification No. 097-44166-00042.

The staff recommends to the Commissioner that the Part 70 Significant Source Modification and Significant Permit Modification be approved.

IDEM Contact

(a) If you have any questions regarding this permit, please contact Taylor Wade, Indiana Department Environmental Management, Office of Air Quality, Permits Branch, 100 North Senate Avenue, MC 61-53 IGCN 1003, Indianapolis, Indiana 46204-2251, or by telephone at (317) 233-0868 or (800) 451-6027, and ask for Taylor Wade or (317) 233-0868.

(b) A copy of the findings is available on the Internet at: http://www.in.gov/ai/appfiles/idem-caats/

(c) For additional information about air permits and how the public and interested parties can participate, refer to the IDEM Air Permits page on the Internet at: https://www.in.gov/idem/airpermit/public-participation/; and the Citizens' Guide to IDEM on the Internet at: https://www.in.gov/idem/resources/citizens-guide-to-idem/.

Appendix A: Emissions Calculations
ATPA

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

1. Existing Emissions Units

Existing Emissions Units ATPA (ton/yr)							
Process/Emission Unit	**PM**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**NO_X**	**VOC**	**CO**
CWS South Mill (63-17)							
Projected Actual Emissions	5.63	5.63	5.63				
Baseline Actual Emissions	5.08	5.08	5.08				
ATPA	**0.56**	**0.56**	**0.56**	**0**	**0**	**0**	**0**
CWS North Product (63-5)							
Projected Actual Emissions	7.88	7.88	7.88				
Baseline Actual Emissions	3.86	3.86	3.86				
ATPA	**4.03**	**4.03**	**4.03**	**0**	**0**	**0**	**0**

2. Project Emissions

Project Emissions (tpy)							
Process/Emission Unit	**PM**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**NO_X**	**VOC**	**CO**
Sum of ATPA Increases	4.58	4.58	4.58	0	0	0	0
Project Emissions	**4.58**	**4.58**	**4.58**	**0.00**	**0.00**	**0.00**	**0.00**
Significant Levels	**25**	**15**	**10**	**40**	**40**	**40**	**100**

Appendix A: Emissions Calculations
ATPA Baseline Actuals

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Unit ID	Process Description	Design Unit Throughput (ton/hr)	Exhaust Flow Rate (dscfm)	Actual Grain Loading (gr/dscf)	PM EF (lb/ton)	Source of Particulate Matter Emission Factors	Control Equipment	2010 Throughput (tons)	2010 Hours of Operation	2010 Actual Throughput (ton/hr)	2010 PM Emissions (tpy)	2010 PM10 Emissions (tpy)	2010 PM-2.5 FIL Emissions (tpy)
63-17	DCWS South Product DC	0.8	3500	0.03	1.1250	Permit Limit	Baghouse	8,774	7,880	1.11	4.9356	4.9356	4.9356
63-5	DCWS North Product DC	2.5	7000	0.03	0.7200	Permit Limit	Baghouse	10,422	8,000	1.30	3.7520	3.7520	3.7520
63-4	DCWS West Mill Feed DC	2.5	6500	0.03	0.6686	Permit Limit	Baghouse	10,422	8,000	1.30	3.4840	3.4840	3.4840

Unit ID	Process Description	Design Unit Throughput (ton/hr)	Exhaust Flow Rate (dscfm)	Actual Grain Loading (gr/dscf)	PM EF (lb/ton)	Source of Particulate Matter Emission Factors	Control Equipment	2011 Throughput (tons)	2011 Hours of Operation	2011 Actual Throughput (ton/hr)	2011 PM Emissions (tpy)	2011 PM10 Emissions (tpy)	2010 PM-2.5 FIL Emissions (tpy)
63-17	DCWS South Product DC	0.8	3500	0.03	1.1250	Permit Limit	Baghouse	8,669	7,785	1.11	4.8763	4.8763	4.8763
63-5	DCWS North Product DC	2.5	7000	0.03	0.7200	Permit Limit	Baghouse	10,297	7,904	1.30	3.7069	3.7069	3.7069
63-4	DCWS West Mill Feed DC	2.5	6500	0.03	0.6686	Permit Limit	Baghouse	10,297	7,904	1.30	3.4421	3.4421	3.4421

Unit ID	Process Description	Design Unit Throughput (ton/hr)	Exhaust Flow Rate (dscfm)	Actual Grain Loading (gr/dscf)	PM EF (lb/ton)	Source of Particulate Matter Emission Factors	Control Equipment	2012 Throughput (tons)	2012 Hours of Operation	2012 Actual Throughput (ton/hr)	2012 PM Emissions (tpy)	2012 PM10 Emissions (tpy)	2010 PM-2.5 FIL Emissions (tpy)
63-17	DCWS South Product DC	0.8	3500	0.03	1.1250	Permit Limit	Baghouse	8,937	8,026	1.11	5.0269	5.0269	5.0269
63-5	DCWS North Product DC	2.5	7000	0.03	0.7200	Permit Limit	Baghouse	10,615	8,149	1.30	3.8214	3.8214	3.8214
63-4	DCWS West Mill Feed DC	2.5	6500	0.03	0.6686	Permit Limit	Baghouse	10,615	8,149	1.30	3.5484	3.5484	3.5484

Unit ID	Process Description	Design Unit Throughput (ton/hr)	Exhaust Flow Rate (dscfm)	Actual Grain Loading (gr/dscf)	PM EF (lb/ton)	Source of Particulate Matter Emission Factors	Control Equipment	2013 Throughput (tons)	2013 Hours of Operation	2013 Actual Throughput (ton/hr)	2013 PM Emissions (tpy)	2013 PM10 Emissions (tpy)	2010 PM-2.5 FIL Emissions (tpy)
63-17	DCWS South Product DC	0.8	3500	0.03	1.1250	Permit Limit	Baghouse	9,112	8,183	1.11	5.1254	5.1254	5.1254
63-5	DCWS North Product DC	2.5	7000	0.03	0.7200	Permit Limit	Baghouse	10,823	8,308	1.30	3.8962	3.8962	3.8962
63-4	DCWS West Mill Feed DC	2.5	6500	0.03	0.6686	Permit Limit	Baghouse	10,823	8,308	1.30	3.6179	3.6179	3.6179

Unit ID	Process Description	Design Unit Throughput (ton/hr)	Exhaust Flow Rate (dscfm)	Actual Grain Loading (gr/dscf)	PM EF (lb/ton)	Source of Particulate Matter Emission Factors	Control Equipment	2014 Throughput (tons)	2014 Hours of Operation	2014 Actual Throughput (ton/hr)	2014 PM Emissions (tpy)	2014 PM10 Emissions (tpy)	2010 PM-2.5 FIL Emissions (tpy)
63-17	DCWS South Product DC	0.8	3500	0.03	1.1250	Permit Limit	Baghouse	7,717	6,930	1.11	4.3406	4.3406	4.3406
63-5	DCWS North Product DC	2.5	7000	0.03	0.7200	Permit Limit	Baghouse	9,166	7,036	1.30	3.2996	3.2996	3.2996
63-4	DCWS West Mill Feed DC	2.5	6500	0.03	0.6686	Permit Limit	Baghouse	9,166	7,036	1.30	3.0639	3.0639	3.0639

Unit ID	Process Description	Design Unit Throughput (ton/hr)	Exhaust Flow Rate (dscfm)	Actual Grain Loading (gr/dscf)	PM EF (lb/ton)	Source of Particulate Matter Emission Factors	Control Equipment	2015 Throughput (tons)	2015 Hours of Operation	2015 Actual Throughput (ton/hr)	2015 PM Emissions (tpy)	2015 PM10 Emissions (tpy)	2010 PM-2.5 FIL Emissions (tpy)
63-17	DCWS South Product DC	0.8	3500	0.03	1.1250	Permit Limit	Baghouse	7,492	7,296	1.03	4.2145	4.2145	4.2145
63-5	DCWS North Product DC	2.5	7000	0.03	0.7200	Permit Limit	Baghouse	8,899	7,770	1.15	3.2038	3.2038	3.2038
63-4	DCWS West Mill Feed DC	2.5	6500	0.03	0.6686	Permit Limit	Baghouse	8,899	7,770	1.15	2.9749	2.9749	2.9749

Unit ID	Process Description	Design Unit Throughput (ton/hr)	Exhaust Flow Rate (dscfm)	Actual Grain Loading (gr/dscf)	PM EF (lb/ton)	Source of Particulate Matter Emission Factors	Control Equipment	2016 Throughput (tons)	2016 Hours of Operation	2016 Actual Throughput (ton/hr)	2016 PM Emissions (tpy)	2016 PM10 Emissions (tpy)	2010 PM-2.5 FIL Emissions (tpy)
63-17	DCWS South Product DC	0.8	3500	0.03	1.1250	Permit Limit	Baghouse	8,174	8,001	1.02	4.5980	4.5980	4.5980
63-5	DCWS North Product DC	2.5	7000	0.03	0.7200	Permit Limit	Baghouse	9,709	7,889	1.23	3.4953	3.4953	3.4953
63-4	DCWS West Mill Feed DC	2.5	6500	0.03	0.6686	Permit Limit	Baghouse	9,709	7,889	1.23	3.2457	3.2457	3.2457

Unit ID	Process Description	Design Unit Throughput (ton/hr)	Exhaust Flow Rate (dscfm)	Actual Grain Loading (gr/dscf)	PM EF (lb/ton)	Source of Particulate Matter Emission Factors	Control Equipment	2017 Throughput (tons)	2017 Hours of Operation	2017 Actual Throughput (ton/hr)	2017 PM Emissions (tpy)	2017 PM10 Emissions (tpy)	2010 PM-2.5 FIL Emissions (tpy)
63-17	DCWS South Product DC	0.8	3500	0.03	1.1250	Permit Limit	Baghouse	7,205	7,521	0.96	4.0529	4.0529	4.0529
63-5	DCWS North Product DC	2.5	7000	0.03	0.7200	Permit Limit	Baghouse	8,558	7,394	1.16	3.0809	3.0809	3.0809
63-4	DCWS West Mill Feed DC	2.5	6500	0.03	0.6686	Permit Limit	Baghouse	8,558	7,394	1.16	2.8609	2.8609	2.8609

Unit ID	Process Description	Design Unit Throughput (ton/hr)	Exhaust Flow Rate (dscfm)	Actual Grain Loading (gr/dscf)	PM EF (lb/ton)	Source of Particulate Matter Emission Factors	Control Equipment	2018 Throughput (tons)	2018 Hours of Operation	2018 Actual Throughput (ton/hr)	2018 PM Emissions (tpy)	2018 PM10 Emissions (tpy)	2010 PM-2.5 FIL Emissions (tpy)
63-17	DCWS South Product DC	0.8	3500	0.03	1.1250	Permit Limit	Baghouse	4,804	8,092	0.59	2.7020	2.7020	2.7020
63-5	DCWS North Product DC	2.5	7000	0.03	0.7200	Permit Limit	Baghouse	8,558	7,562	1.13	3.0810	3.0810	3.0810
63-4	DCWS West Mill Feed DC	2.5	6500	0.03	0.6686	Permit Limit	Baghouse	8,558	7,562	1.13	2.8609	2.8609	2.8609

Unit ID	Process Description	Design Unit Throughput (ton/hr)	Exhaust Flow Rate (dscfm)	Actual Grain Loading (gr/dscf)	PM EF (lb/ton)	Source of Particulate Matter Emission Factors	Control Equipment	2019 Throughput (tons)	2019 Hours of Operation	2019 Actual Throughput (ton/hr)	2019 PM Emissions (tpy)	2019 PM10 Emissions (tpy)	2010 PM-2.5 FIL Emissions (tpy)
63-17	DCWS South Product DC	0.8	3500	0.03	1.1250	Permit Limit	Baghouse	4,730	7,855	0.60	2.6607	2.6607	2.6607
63-5	DCWS North Product DC	2.5	7000	0.03	0.7200	Permit Limit	Baghouse	8,428	7,601	1.11	3.0339	3.0339	3.0339
63-4	DCWS West Mill Feed DC	2.5	6500	0.03	0.6686	Permit Limit	Baghouse	8,428	7,601	1.11	2.8172	2.8172	2.8172

Unit ID	Process Description	Design Unit Throughput (ton/hr)	Exhaust Flow Rate (dscfm)	Actual Grain Loading (gr/dscf)	PM EF (lb/ton)	Source of Particulate Matter Emission Factors	Control Equipment	2020 Throughput (tons)	2020 Hours of Operation	2020 Actual Throughput (ton/hr)	2020 PM Emissions (tpy)	2020 PM10 Emissions (tpy)	2010 PM-2.5 FIL Emissions (tpy)
63-17	DCWS South Product DC	0.8	3500	0.03	1.1250	Permit Limit	Baghouse	4,865	7,628	0.64	2.7367	2.7367	2.7367
63-5	DCWS North Product DC	2.5	7000	0.03	0.7200	Permit Limit	Baghouse	8,668	6,877	1.26	3.1206	3.1206	3.1206
63-4	DCWS West Mill Feed DC	2.5	6500	0.03	0.6686	Permit Limit	Baghouse	8,668	6,877	1.26	2.8977	2.8977	2.8977

Actual	PM			PM10			PM2.5		
	63-17	63-5	63-4	63-17	63-5	63-4	63-17	63-5	63-4
2010	4.94	3.75	3.48	4.94	3.75	3.48	4.94	3.75	3.48
2011	4.88	3.71	3.44	4.88	3.71	3.44	4.88	3.71	3.44
2012	5.03	3.82	3.55	5.03	3.82	3.55	5.03	3.82	3.55
2013	5.13	3.90	3.62	5.13	3.90	3.62	5.13	3.90	3.62
2014	4.34	3.30	3.06	4.34	3.30	3.06	4.34	3.30	3.06
2015	4.21	3.20	2.97	4.21	3.20	2.97	4.21	3.20	2.97
2016	4.60	3.50	3.25	4.60	3.50	3.25	4.60	3.50	3.25
2017	4.05	3.08	2.86	4.05	3.08	2.86	4.05	3.08	2.86
2018	2.70	3.08	2.86	2.70	3.08	2.86	2.70	3.08	2.86
2019	2.66	3.03	2.82	2.66	3.03	2.82	2.66	3.03	2.82
2020	2.74	3.12	2.90	2.74	3.12	2.90	2.74	3.12	2.90

	PM			PM10			PM2.5		
	63-17	63-5	63-4	63-17	63-5	63-4	63-17	63-5	63-4
2010-2011	4.91	3.73	3.46	4.91	3.73	3.46	4.91	3.73	3.46
2011-2012	4.95	3.76	3.50	4.95	3.76	3.50	4.95	3.76	3.50
2012-2013	5.08	3.86	3.58	5.08	3.86	3.58	5.08	3.86	3.58
2013-2014	4.73	3.60	3.34	4.73	3.60	3.34	4.73	3.60	3.34
2014-2015	4.28	3.25	3.02	4.28	3.25	3.02	4.28	3.25	3.02
2015-2016	4.41	3.35	3.11	4.41	3.35	3.11	4.41	3.35	3.11
2016-2017	4.33	3.29	3.05	4.33	3.29	3.05	4.33	3.29	3.05
2017-2018	3.38	3.08	2.86	3.38	3.08	2.86	3.38	3.08	2.86
2018-2019	2.68	3.06	2.84	2.68	3.06	2.84	2.68	3.06	2.84
2019-2020	2.70	3.08	2.86	2.70	3.08	2.86	2.70	3.08	2.86

Appendix A: Emission Calculations
Modification Summary

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Product Recovery Cost Analysis

Maximum Product Throughput (per bin)[1]	Uncontrolled Emission Factor	Product Lost as PM[2]	Uncontrolled PTE	Filter Control Efficiency[3]	Product Recovered by Bin Vent Filters
ton/hr	*(lb/ton)**	*lb/hr*	*ton/hr*	*%*	*ton/hr*
2.50	3.14	7.85	3.93E-03	99.00%	0.0039

1. From Title V Permit
2. Per vendor efficiency specification
* Emission factor from AP 42 Chapter 11.12 Table 11.12-2 Concrete Batching

Product Recovery Value and Equipment Cost

Value of Product		Product Recovery Value		Total Annual Cost of Recovery Equipment	Time to Realize Investment
$/ lb	*$/ton*	*$/hr*	*$/yr*	*$/yr*	*hrs/yr*
$ 0.70	$ 1,400	$ 5.44	$ 50,000	$ 17,057	3135.53

Capital Costs

DC CWS North Product (63-5)	$	69,000
Total Capital Costs, P	$	69,000
Lifetime of Equipment (years), N		10
Interest Rate (%), *i*		0.1
Annualized Capital Cost, A	$	11,229
Operating Costs		
Dust Collector operating cost: $0.30/hr (based on air usage bag pulsing & blowdowns, energy for fans, etc)	$	2,628
Maintenance Costs		
Bag replacement cost (#9/#10): $40/bag. 80 bags.	$	3,200
Total Annual Operating Costs	$	5,828
Total Annual Cost	**$**	**17,057**

Product Savings

Product emitted to baghouse	7.85	lbs/hr
	68766	lbs/yr
Baghouse effiency	99.00%	
Estimated amount of recovered material	68078.34	lbs/yr
Total Annual Value of captured/recovered material	**$47,654.84**	

Conversion Factors

7,000	gr/lb	8,760	hr/yr
60	min/hr	2,000	lb/ton
8760	hrs/yr		

Appendix A: Emission Calculations
Modification Summary

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Product Recovery Cost Analysis

Maximum Product Throughput (per bin)[1]	Uncontrolled Emission Factor	Product Lost as PM	Uncontrolled PTE	Filter Control Efficiency[2]	Product Recovered by Bin Vent Filters
ton/hr	*(lb/ton)**	*lb/hr*	*ton/hr*	*%*	*ton/hr*
0.80	3.14	2.51	1.26E-03	99.00%	1.24E-03

1. From Title V Permit
2. Per vendor efficiency specification
* Emission factor from AP 42 Chapter 11.12 Table 11.12-2 Concrete Batching

Product Recovery Value and Equipment Cost

Value of Product		Product Recovery Value		Total Annual Cost of Recovery Equipment	Time to Realize Investment
$/ lb	*$/ton*	*$/hr*	*$/yr*	*$/yr*	*hrs/yr*
$ 0.70	$ 1,400	$ 1.74	$ 15,250	$ 17,297	9936.39

Capital Costs

DC CWS South Mill (63-17)	$	69,000
Total Capital Costs, P	$	69,000
Lifetime of Equipment (years), N		10
Interest Rate (%), *i*		0.1
Annualized Capital Cost, A	$	11,229

Operating Costs

Dust Collector operating cost: $0.30/hr (based on air usage bag pulsing & blowdowns, energy for fans, etc)	$	2,628
Maintenance Costs		
Bag replacement cost (#9/#10): $40/bag. 86 bags.	$	3,440
Total Annual Operating Costs	$	6,068
Total Annual Cost	**$**	**17,297**

Product Savings

Product emitted to baghouse	2.51	lbs/hr
	22005.12	lbs/yr
Baghouse effiency	99.0%	
Estimated amount of recovered material	21785.07	lbs/yr
Total Annual Value of captured/recovered material	**$ 15,249.55**	

Conversion Factors

7,000	gr/lb	8,760	hr/yr
60	min/hr	2,000	lb/ton
8760	hrs/yr		

Appendix A: Emissions Calculations
Modification Summary

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

PTE of Each New Emissions Unit (tons/yr)								
Emission Unit	**PM**	**PM10**	**PM2.5 ***	**SO_2**	**NOx**	**VOC**	**CO**	**Total HAPs**
CWS North Product (63-5)	7.88	7.88	7.88	0.00	0.00	0.00	0.00	0.00
CWS South Mill (63-17)	563.14	563.14	563.14	0.00	0.00	0.00	0.00	0.00
Total	**571.03**	**571.03**	**571.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Appendix A: Emissions Calculations
Summary of Particulate Emissions

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Permit List No.	Unit Number	Equipment Description	Stack	Control Equipment	Integral/ Inherent	PTE After Controls (ton/yr)			PTE Before Controls (ton/yr)			Uncontrolled PTE for Part 70 (ton/yr)			Limited PTE for PSD Purposes (ton/yr)		
						PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5
(a)	40-4	#1 Starch Flash Dryer (30 MMBtu/hr)	40-4	WS: Particulate	no	31.69	31.69	31.69	275.29	275.29	275.29	275.29	275.29	275.29	44.10	44.10	44.10
(b)	40-3	#2 Starch Flash Dryer (36 MMBtu/hr)	40-3	WS: Particulate	no	54.81	54.81	54.81	943.42	943.42	943.42	943.42	943.42	943.42	35.94	35.94	54.81
(c)	40-2	#3 Starch Flash Dryer (36 MMBtu/hr)	40-2	WS: Particulate	no	45.05	45.05	45.05	863.05	863.05	863.05	863.05	863.05	863.05	31.90	45.05	45.05
(d)	575-1	#4 Starch Flash Dryer (43 MMBtu/hr)	575-1	WS: Particulate	no	56.83	56.83	56.83	11366.48	11366.48	11366.48	11366.48	11366.48	11366.48	32.40	56.83	56.83
(e)	575-2	#5 Starch Flash Dryer (38 MMBtu/hr)	575-2	WS: Particulate	no	34.77	34.77	34.77	6954.44	6954.44	6954.44	6954.44	6954.44	6954.44	32.40	34.77	34.77
(f)	575-3	#6 Starch Flash Dryer (40 MMBtu/hr)	575-3	WS: Particulate	no	37.89	37.89	37.89	7577.65	7577.65	7577.65	7577.65	7577.65	7577.65	34.25	27.39	37.89
(g)	5549-1	#1 Spray Dryer (25 MMBtu/hr)	5549-1	WS: Particulate	no	29.28	29.28	29.28	5856.69	5856.69	5856.69	5856.69	5856.69	5856.69	37.50	37.50	29.28
(h)	5549-2	#2 Spray Dryer (25 MMBtu/hr)	5549-2	WS: Particulate	no	29.28	29.28	29.28	5856.69	5856.69	5856.69	5856.69	5856.69	5856.69			29.28
(i)	5502-1A	Feed Dryer (77 MMBtu/hr)	5502-7	First Effect Wash Water System: SO2; RTO: Particulate and VOC	no	19.32	19.32	19.32	392.74	392.74	392.74	392.74	392.74	392.74	19.85	19.85	19.85
(j)	5502-1B	Germ Dryer (20 MMBtu/hr)	5502-7	RTO: Particulate and VOC	no												
(k)	5502-1C	Gluten Dryer (32 MMBtu/hr)	5502-7	RTO: Particulate and VOC	no												
(l)	5502-1D	RTO (18 MMBtu/hr)	5502-7	N/A	no												
(m)	5549-28	Spray Agglomerator #3	5549-28	WS: Particulate	no	35.67	35.67	35.67	3566.57	3566.57	3566.57	3566.57	3566.57	3566.57	35.67	35.67	35.67
(n)	5552-1	Product Storage Hopper	5552-1	BH: Particulate	*	0.92	0.92	0.92	91.98	91.98	91.98	0.92	0.92	0.92	0.92	0.92	0.92
(o)	5552-2	Product Transfer Hopper	5552-2	BH: Particulate	*	0.13	0.13	0.13	13.14	13.14	13.14	0.13	0.13	0.13	0.13	0.13	0.13
(p)	5503-2	Germ Bin	5503-2	DCS (5503-5): Particulate	no	3.24	3.24	3.24	324.37	324.37	324.37	324.37	324.37	324.37	3.24	3.24	3.24
(p)	5503-3	Pellet Bin #1	5503-2	DCS (5503-5): Particulate	no	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2
(p)	5503-4	Pellet Bin #2	5503-2	DCS (5503-5): Particulate	no	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2
(q)	71-7	DSW Packing Fugitive Dust Collector	71-7	BH: Particulate	no	10.14	10.14	10.14	1013.66	1013.66	1013.66	1013.66	1013.66	1013.66	10.14	10.14	10.14
(r)	577-2	RSP North Packing Line	577-2	BH: Particulate	*	3.60	3.60	3.60	360.41	360.41	360.41	3.60	3.60	3.60	3.59	3.59	3.60
(s)	5503-1	Gluten Receiver	5503-1	BH: Particulate	*	6.98	6.98	6.98	1395.09	1395.09	1395.09	6.98	6.98	6.98	6.98	6.98	6.98
(t)	5502-5	Pellet Cooler	5502-5	CY: Particulate	no	5.18	5.18	5.18	517.72	517.72	517.72	517.72	517.72	517.72	5.18	5.18	5.18
(t)	5502-6	Germ Cooler	5502-6	CY: Particulate	no	4.54	4.54	4.54	453.52	453.52	453.52	453.52	453.52	453.52	4.53	4.53	4.54
(u)	5502-4	2 Loose Feed Bins	5502-3	BH: Particulate	no	w/5502-3	w/5502-3	w/5502-3	w/5502-3	w/5502-3	w/5502-3	w/5502-3	w/5502-3	w/5502-3	w/5502-3	w/5502-3	w/5502-3
(v)	5502-3	Hammer Mill	5502-3	BH: Particulate	no	4.39	4.39	4.39	878.50	878.50	878.50	878.50	878.50	878.50	4.39	4.39	4.39
(w)	42-10	DSE Bag Slitter	42-10	BH: Particulate	no	5.63	5.63	5.63	563.14	563.14	563.14	563.14	563.14	563.14	2.40	5.63	5.63
(x)	577-5	RSP Hopper #4	577-5	BH: Particulate	*	1.69	1.69	1.69	168.94	168.94	168.94	1.69	1.69	1.69	1.69	1.69	1.69
(y)	577-6	RSP Hopper #6	577-6	BH: Particulate	*	1.69	1.69	1.69	168.94	168.94	168.94	1.69	1.69	1.69	1.69	1.69	1.69
(z)	577-7	RSP Hopper #5	577-7	BH: Particulate	*	1.69	1.69	1.69	168.94	168.94	168.94	1.69	1.69	1.69	1.69	1.69	1.69
(aa)	577-8	RSP Hopper #1	577-8	BH: Particulate	*	1.69	1.69	1.69	168.94	168.94	168.94	1.69	1.69	1.69	1.69	1.69	1.69
(bb)	577-9	RSP Hopper #2	577-9	BH: Particulate	*	1.69	1.69	1.69	168.94	168.94	168.94	1.69	1.69	1.69	1.69	1.69	1.69
(cc)	577-10	RSP Hopper #3	577-10	BH: Particulate	*	1.69	1.69	1.69	168.94	168.94	168.94	1.69	1.69	1.69	1.69	1.69	1.69
(dd)	71-1	Industrial Packer	71-1	BH: Particulate	no	5.97	5.97	5.97	59.69	59.69	59.69	59.69	59.69	59.69	0.90	5.97	5.97
(ee	5549-3	Spray Dryer Products Receiver	5549-3	BH: Particulate	*	0.64	0.64	0.64	63.82	63.82	63.82	0.64	0.64	0.64	0.64	0.64	0.64
(ee)	5549-4	Spray Dryer Products Receiver	5549-4	BH: Particulate	*	0.64	0.64	0.64	63.82	63.82	63.82	0.64	0.64	0.64	0.64	0.64	0.64
(ff)	5549-7	Spray Dryer Storage Hopper #1	5549-7	BH: Particulate	*	0.17	0.17	0.17	16.89	16.89	16.89	0.17	0.17	0.17	0.17	0.17	0.17
(gg)	5549-8	Spray Dryer Storage Hopper #2	5549-8	BH: Particulate	*	0.17	0.17	0.17	16.89	16.89	16.89	0.17	0.17	0.17	0.17	0.17	0.17
(hh)	5549-9	Spray Dryer Storage Hopper #3	5549-9	BH: Particulate	*	0.17	0.17	0.17	16.89	16.89	16.89	0.17	0.17	0.17	0.17	0.17	0.17
(ii)	5549-10	Spray Dryer Storage Hopper #4	5549-10	BH: Particulate	*	0.17	0.17	0.17	16.89	16.89	16.89	0.17	0.17	0.17	0.17	0.17	0.17
(jj)	5549-12	Agglomerator Feed storage bin	5549-12	BH: Particulate	*	0.57	0.57	0.57	57.44	57.44	57.44	0.57	0.57	0.57	0.57	0.57	0.57
(kk)	5549-13	Agglomerator (includes 1.824 MMBtu/hr burner)	5549-13	BH: Particulate	no	4.69	4.69	4.69	234.64	234.64	234.64	234.64	234.64	234.64	4.27	4.27	4.69
(ll)	5549-14	Agglomerator Equipment Aspiration	5549-14	BH: Particulate	**	1.07	1.07	1.07	106.62	106.62	106.62	106.62	106.62	106.62	1.07	1.07	1.07
(mm)(1)	5549-17	Bulk Bag Packer Filter Receiver	5549-17	BH: Particulate	*	0.17	0.17	0.17	16.89	16.89	16.89	0.17	0.17	0.17	0.18	0.18	0.17
(mm)(2)	5549-18	Line 1 Middle Packer	5549-18	BH: Particulate	*	1.73	1.73	1.73	172.70	172.70	172.70	1.73	1.73	1.73	1.23	1.23	1.73
(mm)(3)	5549-19	Line 1 North Packer	5549-19	BH: Particulate	*	2.03	2.03	2.03	202.73	202.73	202.73	2.03	2.03	2.03	1.05	1.05	2.03
(mm)(4)	5549-20	#2 Fugitive Dust Collector	5549-20	BH: Particulate	no	5.26	5.26	5.26	525.60	525.60	525.60	525.60	525.60	525.60	4.07	4.07	5.26
(mm)(5)	5549-21	Line 1 Fugitive Dust Collector	5549-21	BH: Particulate	no	5.26	5.26	5.26	525.60	525.60	525.60	525.60	525.60	525.60	5.26	5.26	5.26
(mm)(6)	5549-26	Line 2 Receiver	5549-26	BH: Particulate	*	2.03	2.03	2.03	202.73	202.73	202.73	2.03	2.03	2.03	1.14	1.14	2.03
(nn)	56-1	Corn Dump Truck	56-1	BH: Particulate	no	26.28	26.28	26.28	2628.00	2628.00	2628.00	2628.00	2628.00	2628.00	7.02	26.28	26.28
(oo)(1)	42-3A	DSE Hopper #9	6	BH: Particulate	*	4.32	4.32	4.32	432.49	432.49	432.49	4.32	4.32	4.32	1.80	4.32	4.32
(oo)(2)	42-3B	DSE Hopper #10	7	BH: Particulate	*	4.32	4.32	4.32	432.49	432.49	432.49	4.32	4.32	4.32	1.80	4.32	4.32
(oo)(3)	42-3C	DSE Hopper #11	43-3C	BH: Particulate	*	4.32	4.32	4.32	432.49	432.49	432.49	4.32	4.32	4.32	1.80	4.32	4.32
(oo)(4)	42-3D	DSE Hopper #12	9	BH: Particulate	*	4.32	4.32	4.32	432.49	432.49	432.49	4.32	4.32	4.32	1.80	4.32	4.32
(oo)(5)	42-3E	DSE Hopper #13	10	BH: Particulate	*	4.32	4.32	4.32	432.49	432.49	432.49	4.32	4.32	4.32	1.80	4.32	4.32
(oo)(6)	42-3F	DSE Hopper #14	11	BH: Particulate	*	4.32	4.32	4.32	432.49	432.49	432.49	4.32	4.32	4.32	1.80	4.32	4.32
(oo)(7)	42-7A	DSE Hopper #2	14	BH: Particulate	*	3.12	3.12	3.12	312.36	312.36	312.36	3.12	3.12	3.12	1.70	3.12	3.12
(oo)(8)	42-7B	DSE Hopper #4	14	BH: Particulate	*	3.12	3.12	3.12	312.36	312.36	312.36	3.12	3.12	3.12	1.70	3.12	3.12
(oo)(9)	42-7C	DSE Hopper #6	16	BH: Particulate	*	3.12	3.12	3.12	312.36	312.36	312.36	3.12	3.12	3.12	1.70	3.12	3.12
(oo)(10)	42-8A	DSE Hopper #1	17A	BH: Particulate	**	2.25	2.25	2.25	225.26	225.26	225.26	225.26	225.26	225.26	4.20	2.25	2.25
(oo)(11)	42-8B	DSE Hopper #3	17B	BH: Particulate	**	2.25	2.25	2.25	225.26	225.26	225.26	225.26	225.26	225.26		2.25	2.25
(oo)(12)	42-8C	DSE Hopper #5	17C	BH: Particulate	**	2.25	2.25	2.25	225.26	225.26	225.26	225.26	225.26	225.26		2.25	2.25
(oo)(13)	42-8D	DSE Hopper #7	17D	BH: Particulate	**	2.25	2.25	2.25	225.26	225.26	225.26	225.26	225.26	225.26		2.25	2.25
(oo)(14)	63-1A	CWS #8	46A	BH: Particulate	*	2.70	2.70	2.70	270.31	270.31	270.31	2.70	2.70	2.70	2.70	2.70	2.70
(oo)(15)	63-17	CWS South Mill	53	BH: Particulate	**	5.63	5.63	5.63	563.14	563.14	563.14	563.14	563.14	563.14	5.63	5.63	5.63
(pp)	56-2	Grain Elevator	24	BH: Particulate	**	11.26	11.26	11.26	1126.29	1126.29	1126.29	1126.29	1126.29	1126.29	11.30	11.26	11.26
(qq)(1)	152-1	Starch Mixer 1 Filter Receiver	152-1	BH: Particulate	*	0.56	0.56	0.56	56.31	56.31	56.31	0.56	0.56	0.56	0.56	0.56	0.56
(qq)(2)	152-2	Mixer 1 Baghouse	152-2	BH: Particulate	*	1.13	1.13	1.13	112.63	112.63	112.63	1.13	1.13	1.13	1.13	1.13	1.13
(qq)(3)	152-4	Starch Mixer 2 Filter/Receiver (Bld 852A)	152-4	BH: Particulate	*	0.68	0.68	0.68	67.58	67.58	67.58	0.68	0.68	0.68	0.68	0.68	0.68
(qq)(4)	152-5	Starch Mixer 2 (Bld 852A)	152-5	BH: Particulate	*	1.13	1.13	1.13	112.63	112.63	112.63	1.13	1.13	1.13	1.13	1.13	1.13
(qq)(5)	152-6	Base Bin	152-6	BH: Particulate	**	0.96	0.96	0.96	95.73	95.73	95.73	95.73	95.73	95.73	0.96	0.96	0.96
(qq)(6)	152-7	Mixer 3-4 Transfer Dust Collector	152-7	BH: Particulate	**	0.56	0.56	0.56	56.31	56.31	56.31	56.31	56.31	56.31	0.56	1.31	0.74
(qq)(7)	152-8	Starch Mixer 4 Bld 852A Filter Receiver	152-8	BH: Particulate	**	0.68	0.68	0.68	67.58	67.58	67.58	67.58	67.58	67.58	0.68	1.58	0.92
(qq)(8)	152-9	Starch Mixer 4 Bld 852A	152-9	BH: Particulate	**	0.02	0.02	0.02	2.25	2.25	2.25	2.25	2.25	2.25	0.02	0.22	0.22
(qq)(9)	152-10	Starch Mixer 3 Bld 852A Filter Receiver	152-10	BH: Particulate	**	0.68	0.68	0.68	67.58	67.58	67.58	67.58	67.58	67.58	0.68	1.58	0.92
(qq)(10)	152-11	Starch Mixer 3 Bld 852A	152-11	BH: Particulate	*	1.13	1.13	1.13	112.63	112.63	112.63	1.13	1.13	1.13	1.13	2.63	1.49
(qq)(11)	152-12	Bulk Bag Dump Receiver	152-12	BH: Particulate	*	0.90	0.90	0.90	90.10	90.10	90.10	0.90	0.90	0.90	0.90	2.10	1.23
(qq)(12)	TF41820 (formerly 61 21)	Product Silo	152-3	BH: Particulate	*	0.66	0.66	0.66	66.34	66.34	66.34	0.66	0.66	0.66	0.66	1.45	0.96
(qq)(13)	TF41818 (formerly 581-2)	Starch Cooling and Conveying System	TF41818	BH: Particulate	*	15.77	15.77	15.77	1576.80	1576.80	1576.80	15.77	15.77	15.77	15.77	10.42	6.96
(qq)(14)	152-15 (formerly TF41819)	Blending Bin	DC41819	BH: Particulate	*	4.51	4.51	4.51	450.51	450.51	450.51	4.51	4.51	4.51	4.51	2.93	1.97
(qq)(15)	40-1A	Sodium Sulfate Conveying System Silo	40-1A	BH: Particulate	*	1.58	1.58	1.58	157.68	157.68	157.68	1.58	1.58	1.58	0.57	0.57	0.57
(qq)(15)	40-1B	Sodium Sulfate Conveying System Receiver	40-1B	BH: Particulate	*	1.41	1.41	1.41	140.79	140.79	140.79	1.41	1.41	1.41	0.57	0.57	0.57
(qq)(16)	42-1	DSE North Packer	5	BH: Particulate	*	11.62	11.62	11.62	1162.33	1162.33	1162.33	11.62	11.62	11.62	0.90	11.62	11.62
(qq)(17)	42-4	DSE Hopper #8	17E	BH: Particulate	*	4.57	4.57	4.57	457.27	457.27	457.27	4.57	4.57	4.57	2.30	4.57	4.57
(qq)(18)	42-6	DSE Negative Receiver	13	BH: Particulate	*	2.70	2.70	2.70	270.31	270.31	270.31	2.70	2.70	2.70	2.50	2.70	2.70

Appendix A: Emissions Calculations
Summary of Particulate Emissions

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Permit List No.	Unit Number	Equipment Description	Stack	Control Equipment	Integral/ Inherent	PTE After Controls (ton/yr)			PTE Before Controls (ton/yr)			Uncontrolled PTE for Part 70 (ton/yr)			Limited PTE for PSD Purposes (ton/yr)		
						PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5
(qq)(19)	42-9	DSE South Packer	18	BH: Particulate	*	11.62	11.62	11.62	1162.33	1162.33	1162.33	11.62	11.62	11.62	11.62	11.62	11.62
(qq)(20)	42-11	DSE Railcar Loading - East Track	20	BH: Particulate	*	2.82	2.82	2.82	281.57	281.57	281.57	2.82	2.82	2.82	2.82	2.82	2.82
(qq)(21)	42-12	DSE Railcar Loading - West Track	21	BH: Particulate	*	2.82	2.82	2.82	281.57	281.57	281.57	2.82	2.82	2.82	2.82	2.82	2.82
(qq)(22)	42-13	DSE Bulk Bag System	106	BH: Particulate	*	5.07	5.07	5.07	506.83	506.83	506.83	5.07	5.07	5.07	2.19	0.44	0.44
(qq)(23)	61-14	Dextrin Blend	61-14	BH: Particulate	**	1.36	1.36	1.36	135.60	135.60	135.60	135.60	135.60	135.60	1.20	1.36	1.36
(qq)(24)	63-3	CWS #7 Dryer Receiver	47	BH: Particulate	*	2.25	2.25	2.25	225.26	225.26	225.26	2.25	2.25	2.25	2.25	2.25	2.25
(qq)(26)	63-5	CWS North Product	49	BH: Particulate	*	7.88	7.88	7.88	788.40	788.40	788.40	7.88	7.88	7.88	7.88	7.88	7.88
(qq)(27)	63-9	CWS Packer	50	BH: Particulate	*	1.23	1.23	1.23	123.22	123.22	123.22	1.23	1.23	1.23	1.23	1.23	1.23
(qq)(28)	63-15	CWS #9 and #10 Dryers Receiver	52	BH: Particulate	*	4.05	4.05	4.05	405.46	405.46	405.46	4.05	4.05	4.05	4.05	4.05	4.05
(qq)(29)	63-16A	CWS #11 Dryer	54A	BH: Particulate	*	3.72	3.72	3.72	371.67	371.67	371.67	3.72	3.72	3.72	3.72	3.72	3.72
(qq)(29)	63-16B	CWS #12 and #13 Dryers	54B	BH: Particulate	*	3.72	3.72	3.72	371.67	371.67	371.67	3.72	3.72	3.72	3.72	3.72	3.72
(qq)(30)	63-20	DSW Negative Receiver	56	BH: Particulate	*	1.24	1.24	1.24	123.89	123.89	123.89	1.24	1.24	1.24	1.24	1.24	1.24
(qq)(31)	71-3	Negative Receiver	71-3	BH: Particulate	*	8.45	8.45	8.45	844.71	844.71	844.71	8.45	8.45	8.45	8.45	8.45	8.45
(qq)(32)	71-8	DSW Bulk Car Loading	72	BH: Particulate	*	2.25	2.25	2.25	225.26	225.26	225.26	2.25	2.25	2.25	2.25	2.25	2.25
(qq)(33)	577-1	RSP South Bulk Bag Packing	77	BH: Particulate	*	4.28	4.28	4.28	427.99	427.99	427.99	4.28	4.28	4.28	4.28	4.28	4.28
(qq)(34)	FA-60582	FG Bulk Bag Bin Vent Bld 800	FA-60582	BH: Particulate	**	4.28	4.28	4.28	427.99	427.99	427.99	427.99	427.99	427.99	4.28	3.50	2.85
(qq)(35)	577-3	RSP South Packing Line	79	BH: Particulate	*	11.26	11.26	11.26	1126.29	1126.29	1126.29	11.26	11.26	11.26	11.26	11.26	11.26
(qq)(36)	577-4	RSP Bulk Loading System A	80	BH: Particulate	*	1.97	1.97	1.97	197.10	197.10	197.10	1.97	1.97	1.97	1.97	1.97	1.97
(qq)(37)	577-4A	RSP Bulk Loading Fugitive Dust Collector	81	BH: Particulate	**	0.08	0.08	0.08	8.11	8.11	8.11	8.11	8.11	8.11	0.08	0.08	0.08
(qq)(39)	578-1	CWS Conveying Cyclone Operation	578-1	BH: Particulate	**	4.51	4.51	4.51	450.51	450.51	450.51	450.51	450.51	450.51	4.51	4.51	4.51
(qq)(40)	578-2	CWS Packing Hopper	89	BH: Particulate	*	1.97	1.97	1.97	197.10	197.10	197.10	1.97	1.97	1.97	1.97	1.97	1.97
(qq)(41)	578-3	CWS Milling System	578-3	BH: Particulate	*	6.93	6.93	6.93	692.67	692.67	692.67	6.93	6.93	6.93	6.93	6.93	6.93
(qq)(42)	DC700	Product Receiver Drum A	578-4			0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
(qq)(43)	DC701	Product Receiver Drum B	578-5			0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
(qq)(44)	TF31993 (formerly TF31901)	Product Bin 93	1-158	BH: Particulate	*	3.38	3.38	3.38	337.89	337.89	337.89	3.38	3.38	3.38	3.38	3.38	3.38
(qq)(45)	TF31992 (formerly TF31902)	Product Bin 92	2-158	BH: Particulate	*	2.25	2.25	2.25	225.26	225.26	225.26	2.25	2.25	2.25	2.25	2.25	2.25

Appendix A: Emissions Calculations
Summary of Particulate Emissions

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Permit List No.	Unit Number	Equipment Description	Stack	Control Equipment	Integral/ Inherent	PTE After Controls (ton/yr)			PTE Before Controls (ton/yr)			Uncontrolled PTE for Part 70 (ton/yr)			Limited PTE for PSD Purposes (ton/yr)		
						PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5
(qq)(46)	TF31991	Product Bin 91	3-158	BH: Particulate	*	2.25	2.25	2.25	225.26	225.26	225.26	2.25	2.25	2.25	2.25	2.25	2.25
(qq)(47)	SH31913	Surge Tank Bin 158-3	7-158	BH: Particulate	**	0.23	0.23	0.23	22.53	22.53	22.53	22.53	22.53	22.53	0.23	0.23	0.23
(qq)(48)	DC-31900	Bulk Bag Unload Bin 158-4	8-158	DCS: Particulate	*	0.68	0.68	0.68	67.58	67.58	67.58	0.68	0.68	0.68	0.68	0.68	0.68
(qq)(49)	TR31912	FBR1 Exhaust	5-158	MF: Particulate	**	9.91	9.91	9.91	991.13	991.13	991.13	991.13	991.13	991.13	9.91	9.91	9.91
(qq)(50)	TR31913	FBR1 Cooling System	9-158	CY and BH: Particulate	*	22.53	22.53	22.53	2252.57	2252.57	2252.57	22.53	22.53	22.53	7.49	7.49	7.49
(qq)(51)	PAC-1	Starch Dryer	PAC-1	CY and DCS: Particulate	*	0.56	0.56	0.56	56.31	56.31	56.31	0.56	0.56	0.56	0.56	0.56	0.56
(qq)(52)	PAC-2	Distillation System	PAC-2	Scrubber	N/A	--	--	--	--	--	--	--	--	--	--	--	--
(qq)(53)	5549-22	Line 1 South Packing Hopper	5549-22	BH: Particulate	*	5.41	5.41	5.41	5406.17	5406.17	5406.17	5.41	5.41	5.41	5.41	5.41	5.41
(qq)(54)	TF31980	Base Bin 80	10-158	BH: Particulate	*	1.44	1.44	1.44	143.60	143.60	143.60	1.44	1.44	1.44	0.24	0.24	0.24
(qq)(54)	TF31981	Base Bin 81	11-158	BH: Particulate	*	1.44	1.44	1.44	143.60	143.60	143.60	1.44	1.44	1.44	0.24	0.24	0.24
(qq)(54)	TF31982	Base Bin 82	12-158	BH: Particulate	*	1.44	1.44	1.44	143.60	143.60	143.60	1.44	1.44	1.44	0.24	0.24	0.24
(qq)(55)	TR31922	FBR2 Exhaust	14-158	MF: Particulate	*	6.76	6.76	6.76	675.77	675.77	675.77	6.76	6.76	6.76	2.25	2.25	2.25
(qq)(56)	TR31923	FBR2 Cooling Reactor	15-158	MF: Particulate	*	4.84	4.84	4.84	484.30	484.30	484.30	4.84	4.84	4.84	1.62	1.62	1.62
(qq)(57)	TF31990	Product Bin 90	13-158	MF: Particulate	*	2.48	2.48	2.48	247.78	247.78	247.78	2.48	2.48	2.48	0.41	0.41	0.41
(qq)(59)	TF41822	Base Bin	152-13	BH: Particulate	*	1.55	1.55	1.55	154.68	154.68	154.68	1.55	1.55	1.55	1.55	1.55	1.55
(qq)(60)	TF34031	DSW Product Silo	S34031	BH: Particulate		2.13E-03	2.13E-03	2.13E-03	21.32	21.32	21.32	21.32	21.32	21.32	2.25	2.25	2.25
(qq)(61)	TF34032	DSW Product Silo	S34032	BH: Particulate		2.13E-03	2.13E-03	2.13E-03	21.32	21.32	21.32	21.32	21.32	21.32	2.25	2.25	2.25
(qq)(62)	TF34033	DSW Product Silo	S34033	BH: Particulate		2.13E-03	2.13E-03	2.13E-03	21.32	21.32	21.32	21.32	21.32	21.32	2.25	2.25	2.25
(qq)(63)	TF34034	DSW Product Silo	S34034	BH: Particulate		2.13E-03	2.13E-03	2.13E-03	21.32	21.32	21.32	21.32	21.32	21.32	2.25	2.25	2.25
(qq)(64)	TF31994	Product Bin 94	25-158	BH: Particulate	*	0.83	0.83	0.83	82.59	82.59	82.59	0.83	0.83	0.83	0.83	0.83	0.83
(qq)(65)	TF31983	Base Bin 83	24-158	BH: Particulate	*	0.48	0.48	0.48	47.87	47.87	47.87	0.48	0.48	0.48	0.00	0.00	0.00
(qq)(66)	TR31932	FBR3 Reactor	19-158	MF: Particulate	*	2.25	2.25	2.25	225.26	225.26	225.26	2.25	2.25	2.25	0.00	0.00	0.00
(qq)(67)	TR31933	FBR3 Cooling Reactor	20-158	MF: Particulate	*	1.61	1.61	1.61	161.43	161.43	161.43	1.61	1.61	1.61	0.00	0.00	0.00
Insignificant Activities																	
(a)(1)	FP1	Emergency Fire Pump Engine		None	N/A	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
(a)(2)	FP2	Emergency Fire Pump Engine		None	N/A	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
(a)(3)	FP3	Emergency Fire Pump Engine		None	N/A	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
(b)(1)	YX31914A	Process Heater	158-6	None	N/A	0.04	0.17	0.17	0.04	0.17	0.17	0.04	0.17	0.17	0.04	0.17	0.17
(b)(2)	FH31924	FBR2 Burner	16-158	None	N/A	0.02	0.10	0.10	0.02	0.10	0.10	0.02	0.10	0.10	0.02	0.10	0.10
(b)(5)	FH31934	FBR3 Burner	21-158	None	N/A	0.02	0.10	0.10	0.02	0.10	0.10	0.02	0.10	0.10	0.02	0.10	0.10
(b)(3)	EF31926A	Air Heater 1	17-158	None	N/A	0.003	0.01	0.01	0.003	0.01	0.01	0.003	0.01	0.01	0.003	0.01	0.01
(b)(3)	EF31927A	Air Heater 2	18-158	None	N/A	0.003	0.01	0.01	0.003	0.01	0.01	0.003	0.01	0.01	0.003	0.01	0.01
(b)(6)	EF31936A	FBR3 Dehumidifier Air Heater 1	22-158	None	N/A	0.003	0.013	0.013	0.003	0.013	0.013	0.003	0.01	0.01	0.003	0.01	0.01
(b)(6)	EF31937A	FBR3 Dehumidifier Air Heater 2	23-158	None	N/A	0.003	0.013	0.013	0.003	0.013	0.013	0.003	0.01	0.01	0.003	0.01	0.01
(b)(4)		Drover CWS air heaters		None	N/A	0.04	0.15	0.15	0.04	0.15	0.15	0.04	0.15	0.15	0.04	0.15	0.15
(c)	D1/D2	2 Degreasing Operations		None	N/A	--	--	--	--	--	--	--	--	--	--	--	--
(f)		Gasoline fuel transfer dispensing operation		None	N/A	--	--	--	--	--	--	--	--	--	--	--	--
(j)	S1	Abrasive Blasting		BH: Particulate	no	0.10	0.10	0.10	10.14	10.14	10.14	10.14	10.14	10.14	0.10	0.10	0.10
(k)	T1	3 Acetic Acid Storage Tanks		None	N/A	--	--	--	--	--	--	--	--	--	--	--	--
(l)	T2	4 Hydrochloric Acid Storage Tanks		None	N/A	--	--	--	--	--	--	--	--	--	--	--	--
(m)		10 Small Batch Reactors		None	N/A	--	--	--	--	--	--	--	--	--	--	--	--
(n)	ST1-ST21	Steeping Tanks	ST1-ST21	None	N/A	--	--	--	--	--	--	--	--	--	--	--	--
(o)		7 Millhouse Vent Fans		None	N/A	--	--	--	--	--	--	--	--	--	--	--	--
(p)		50 portable diesel heaters		None		--	--	--	0.80	0.95	0.85	0.80	0.95	0.85	--	--	--
					Total:	**769.7**	**770.1**	**770.1**	**88290.7**	**88291.3**	**88291.2**	**56760.3**	**56760.8**	**56760.7**	**601.5**	**697.0**	**741.9**

The unit has a specific limit for this pollutant.
The unit does not have a specific limit for this pollutant. However, a control device is required to meet a limit for PM and/or PM10, so the PTE is being shown after control.
*Control has been determined to be both integral and inherent to the process.
**Control has been determined to be inherent to the process.
Controls: BH = Baghouse, CY = Cyclone, DCS = Dust Collection System, MF = Metal Filter, RTO = Regenerative Thermal Oxidizer, WS = Wet Scrubber

Appendix A: Emissions Calculations
Summary of SO2, NOx, VOC, and CO Emissions

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Permit List No.	Unit Number	Equipment Description	Stack	Control Equipment	Uncontrolled PTE (ton/yr)				Controlled PTE (ton/yr)				Limited PTE (ton/yr)			
					SO2	NOx	VOC	CO	SO2	NOx	VOC	CO	SO2	NOx	VOC	CO
(a)	40-4	#1 Starch Flash Dryer (30 MMBtu/hr)	40-4	WS: Particulate	0.08	12.88	0.71	10.82	0.08	12.88	0.71	10.82	0.08	12.88	0.71	10.82
(b)	40-3	#2 Starch Flash Dryer (36 MMBtu/hr)	40-3	WS: Particulate	0.09	15.46	0.85	12.99	0.09	15.46	0.85	12.99	0.09	15.46	0.85	12.99
(c)	40-2	#3 Starch Flash Dryer (36 MMBtu/hr)	40-2	WS: Particulate	0.09	15.46	0.85	12.99	0.09	15.46	0.85	12.99	0.09	15.46	0.85	12.99
(d)	575-1	#4 Starch Flash Dryer (43 MMBtu/hr)	575-1	WS: Particulate	0.11	18.46	1.02	15.51	0.11	18.46	1.02	15.51	0.11	18.46	1.02	15.51
(e)	575-2	#5 Starch Flash Dryer (38 MMBtu/hr)	575-2	WS: Particulate	0.10	16.32	0.90	13.71	0.10	16.32	0.90	13.71	0.10	16.32	0.90	13.71
(f)	575-3	#6 Starch Flash Dryer (40 MMBtu/hr)	575-3	WS: Particulate	0.10	17.18	0.94	14.43	0.10	17.18	0.94	14.43	0.10	17.18	0.94	14.43
(g)	5549-1	#1 Spray Dryer (25 MMBtu/hr)	5549-1	WS: Particulate	0.06	10.74	0.59	9.02	0.06	10.74	0.59	9.02	0.06	10.74	0.59	9.02
(h)	5549-2	#2 Spray Dryer (25 MMBtu/hr)	5549-2	WS: Particulate	0.06	10.74	0.59	9.02	0.06	10.74	0.59	9.02	0.06	10.74	0.59	9.02
(i)	5502-1A	Feed Dryer (77 MMBtu/hr)	5502-7	First Effect Wash Water System: SO2; RTO: Particulate and VOC	60.66	33.06	469.76	27.77	24.27	33.06	18.79	27.77	35.26	39.15	21.42	27.77
(j)	5502-1B	Germ Dryer (20 MMBtu/hr)	5502-7	RTO: Particulate and VOC		8.59		7.21		8.59		7.21				7.21
(k)	5502-1C	Gluten Dryer (32 MMBtu/hr)	5502-7	RTO: Particulate and VOC		13.74		11.54		13.74		11.54				11.54
(l)	5502-1D	RTO (18 MMBtu/hr)	5502-7	N/A		7.73		6.49		7.73		6.49				6.49
(m)	5549-28	Spray Agglomerator #3	5549-28	WS: Particulate	0.06	10.74	0.59	9.02	0.06	10.74	0.59	9.02	0.06	10.74	0.59	9.02
(kk)	5549-13	Agglomerator (includes 1.824 MMBtu/hr burner)	5549-13	BH: Particulate	0.005	0.78	0.04	0.66	0.005	0.78	0.04	0.66	0.005	0.78	0.04	0.66
(qq)(52)	PAC-2	Distillation System	PAC-2	Scrubber	--	--	0.04	--	--	--	0.002	--	--	--	--	--
Insignificant Activities																
(a)(1)	FP1	Emergency Fire Pump Engine		None	0.11	1.63	0.13	0.35	0.11	1.63	0.13	0.35	0.11	1.63	0.13	0.35
(a)(2)	FP2	Emergency Fire Pump Engine		None	0.15	2.33	0.19	0.50	0.15	2.33	0.19	0.50	0.15	2.33	0.19	0.50
(a)(3)	FP3	Emergency Fire Pump Engine		None	0.15	2.33	0.19	0.50	0.15	2.33	0.19	0.50	0.15	2.33	0.19	0.50
(b)(1)	YX31914A	Process Heater	158-6	None	0.01	2.19	0.12	1.84	0.01	2.19	0.12	1.84	0.01	2.19	0.12	1.84
(b)(2)	FH31924	FBR2 Burner	16-158	None	0.01	1.29	0.07	1.08	0.01	1.29	0.07	1.08	0.01	1.29	0.07	1.08
(b)(5)	FH31934	**FBR3 Burner**	21-158	None	0.01	1.29	0.07	1.08	0.01	1.29	0.07	1.08	0.01	1.29	0.07	1.08
(b)(3)	EF31926A	Air Heater 1	17-158	None	0.001	0.17	0.01	0.14	0.001	0.17	0.01	0.14	0.001	0.17	0.01	0.14
(b)(3)	EF31927A	Air Heater 2	18-158	None	0.001	0.17	0.01	0.14	0.001	0.17	0.01	0.14	0.001	0.17	0.01	0.14
(b)(6)	EF31936A	**FBR3 Dehumidifier Air Heater 1**	22-158	None	0.001	0.172	0.009	0.144	0.001	0.17	0.01	0.14	0.001	0.17	0.01	0.14
(b)(6)	EF31937A	**FBR3 Dehumidifier Air Heater 2**	23-158	None	0.001	0.172	0.009	0.144	0.001	0.17	0.01	0.14	0.001	0.17	0.01	0.14
(b)(4)		Drover CWS air heaters		None	0.01	1.93	0.11	1.62	0.01	1.93	0.11	1.62	0.01	1.93	0.11	1.62
(c)	D1/D2	2 Degreasing Operations		None	--	--	4.67	--	--	--	4.67	--	--	--	4.67	--
(f)		Gasoline fuel transfer dispensing operation		None	--	--	1.47	--	--	--	1.47	--	--	--	1.47	--
(k)	T1	3 Acetic Acid Storage Tanks		None	--	--	0.04	--	--	--	0.04	--	--	--	0.04	--
(l)	T2	4 Hydrochloric Acid Storage Tanks		None	--	--	--	--	--	--	--	--	--	--	--	--
(m)		10 Small Batch Reactors		None	--	--	9.04	--	--	--	9.04	--	--	--	9.04	--
(n)	ST1 through ST21	Steeping Tanks	ST1 - ST21	None	0.77	--	--	--	0.77	--	--	--	0.77	--	--	--
(o)		7 millhouse vent fans		None	7.89	--	--	--	7.89	--	--	--	7.89	--	--	--
(p)		50 portable diesel heaters		None	0.08	7.95	0.14	1.99	0.08	7.95	0.14	1.99	0.08	7.95	0.14	1.99
				Total:	**70.6**	**213.5**	**493.1**	**170.7**	**34.2**	**213.5**	**42.1**	**170.7**	**45.2**	**189.5**	**44.8**	**170.7**

The unit has a specific limit for this pollutant.
Controls: BH = Baghouse, RTO = Regenerative Thermal Oxidizer, WS = Wet Scrubber

Appendix A: Emissions Calculations
HAPs Emissions -Uncontrolled

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

				Uncontrolled PTE (ton/yr)																								
Permit List No.	**Unit Number**	**Equipment Description**	**Stack**	**Acetaldehyde**	**Acrolein**	**Benzene**	**1,3-Butadiene**	**Dichlorobenzene**	**Formaldehyde**	**Hexane**	**Methanol**	**Propylene Oxide**	**Total PAH HAPs**	**Toluene**	**Xylene**	**Lead**	**Cadmium**	**Chromium**	**Manganese**	**Nickel**	**HCl**	**Arsenic**	**Beryllium**	**Mercury**	**Selenium**	**Total HAPs**	**Worst Single HAP**	**HAP**
(a)	40-4	#1 Starch Flash Dryer (30 MMBtu/hr)	40-4	--	--	2.71E-04	--	1.55E-04	9.66E-03	0.23	--	--	1.47E-06	4.38E-04	--	6.44E-05	1.42E-04	1.80E-04	4.90E-05	2.71E-04	--	--	--	--	--	0.24	0.23	Hexane
(b)	40-3	#2 Starch Flash Dryer (36 MMBtu/hr)	40-3	--	--	3.25E-04	--	1.86E-04	1.16E-02	0.28	--	--	1.76E-06	5.26E-04	--	7.73E-05	1.70E-04	2.16E-04	5.87E-05	3.25E-04	--	--	--	--	--	0.29	0.28	Hexane
(c)	40-2	#3 Starch Flash Dryer (36 MMBtu/hr)	40-2	--	--	3.25E-04	--	1.86E-04	1.16E-02	0.28	--	--	1.76E-06	5.26E-04	--	7.73E-05	1.70E-04	2.16E-04	5.87E-05	3.25E-04	--	--	--	--	--	0.29	0.28	Hexane
(d)	575-1	#4 Starch Flash Dryer (43 MMBtu/hr)	575-1	--	--	3.88E-04	--	2.22E-04	1.38E-02	0.33	--	--	2.10E-06	6.28E-04	--	9.23E-05	2.03E-04	2.59E-04	7.02E-05	3.88E-04	--	--	--	--	--	0.35	0.33	Hexane
(e)	575-2	#5 Starch Flash Dryer (38 MMBtu/hr)	575-2	--	--	3.43E-04	--	1.96E-04	1.22E-02	0.29	--	--	1.86E-06	5.55E-04	--	8.16E-05	1.79E-04	2.28E-04	6.20E-05	3.43E-04	--	--	--	--	--	0.31	0.29	Hexane
(f)	575-3	#6 Starch Flash Dryer (40 MMBtu/hr)	575-3	--	--	3.61E-04	--	2.06E-04	1.29E-02	0.31	--	--	1.96E-06	5.84E-04	--	8.59E-05	1.89E-04	2.40E-04	6.53E-05	3.61E-04	--	--	--	--	--	0.32	0.31	Hexane
(g)	5549-1	#1 Spray Dryer (25 MMBtu/hr)	5549-1	--	--	2.25E-04	--	1.29E-04	8.05E-03	0.19	--	--	1.22E-06	3.65E-04	--	5.37E-05	1.18E-04	1.50E-04	4.08E-05	2.25E-04	--	--	--	--	--	0.20	0.19	Hexane
(h)	5549-2	#2 Spray Dryer (25 MMBtu/hr)	5549-2	--	--	2.25E-04	--	1.29E-04	8.05E-03	0.19	--	--	1.22E-06	3.65E-04	--	5.37E-05	1.18E-04	1.50E-04	4.08E-05	2.25E-04	--	--	--	--	--	0.20	0.19	Hexane
(i)*	5502-1A	Feed Dryer (77 MMBtu/hr)	5502-7	111.43	0.55	6.94E-04	--	3.97E-04	2.23	5.95E-01	6.22	--	3.77E-06	1.12E-03	--	1.65E-04	3.64E-04	4.63E-04	1.26E-04	6.94E-04	--	--	--	--	--	121.56	111.43	Acetaldehyde
(j)*	5502-1B	Germ Dryer (20 MMBtu/hr)	5502-7			1.80E-04	--	1.03E-04		1.55E-01		--	9.79E-07	2.92E-04	--	4.29E-05	9.45E-05	1.20E-04	3.26E-05	1.80E-04	--	--	--	--	--			
(k)*	5502-1C	Gluten Dryer (32 MMBtu/hr)	5502-7			2.89E-04	--	1.65E-04		2.47E-01		--	1.57E-06	4.67E-04	--	6.87E-05	1.51E-04	1.92E-04	5.22E-05	2.89E-04	--	--	--	--	--			
(l)*	5502-1D	RTO (18 MMBtu/hr)	5502-7			1.62E-04	--	9.28E-05		1.39E-01		--	8.81E-07	2.63E-04	--	3.86E-05	8.50E-05	1.08E-04	2.94E-05	1.62E-04	--	--	--	--	--			
(m)	5549-28	Spray Agglomerator #3	5549-28	--	--	2.25E-04	--	1.29E-04	8.05E-03	1.93E-01	--	--	1.22E-06	3.65E-04	--	5.37E-05	1.18E-04	1.50E-04	4.08E-05	2.25E-04	--	--	--	--	--	0.20	0.19	Hexane
(kk)	5549-13	Agglomerator (includes 1.824 MMBtu/hr burner)	5549-13	--	--	1.64E-05	--	9.40E-06	5.87E-04	1.41E-02	--	--	8.93E-08	2.66E-05	--	3.92E-06	8.62E-06	1.10E-05	2.98E-06	1.64E-05	--	--	--	--	--	1.48E-02	1.41E-02	Hexane
(ss)(52)	PAC-2	Distillation System	PAC-2	--	--	--	--	--	--	--	--	0.04	--	--	--	--	--	--	--	--	--	--	--	--	--	4.02E-02	4.02E-02	Propylene Oxide
Insignificant Activities																												
(a)(1)	FP1	Emergency Fire Pump Engine		2.82E-04	3.40E-05	3.43E-04	1.44E-05	--	4.34E-04	--	--	--	6.17E-05	1.50E-04	1.05E-04	--	--	--	--	--	--	--	--	--	--	1.42E-03	4.34E-04	Formaldehyde
(a)(2)	FP2	Emergency Fire Pump Engine		4.03E-04	4.86E-05	4.90E-04	2.05E-05	--	6.20E-04	--	--	--	8.82E-05	2.15E-04	1.50E-04	--	--	--	--	--	--	--	--	--	--	2.03E-03	6.20E-04	Formaldehyde
(a)(3)	FP3	Emergency Fire Pump Engine		4.03E-04	4.86E-05	4.90E-04	2.05E-05	--	6.20E-04	--	--	--	8.82E-05	2.15E-04	1.50E-04	--	--	--	--	--	--	--	--	--	--	2.03E-03	6.20E-04	Formaldehyde
(b)(1)	YX31914A	Process Heater	158-6	--	--	4.60E-05	--	2.63E-05	1.64E-03	3.94E-02	--	--	2.50E-07	7.45E-05	--	1.10E-05	2.41E-05	3.07E-05	8.32E-06	4.60E-05	--	--	--	--	--	4.13E-02	3.94E-02	Hexane
(b)(2)	FH31924	FBR2 Burner	16-158	--	--	2.71E-05	--	1.55E-05	9.66E-04	2.32E-02	--	--	1.47E-07	4.38E-05	--	6.44E-06	1.42E-05	1.80E-05	4.90E-06	2.71E-05	--	--	--	--	--	2.43E-02	2.32E-02	Hexane
(b)(5)	FH31934	**FBR3 Burner**	21-158	--	--	2.71E-05	--	1.55E-05	9.66E-04	2.32E-02	-	-	1.47E-07	4.38E-05		6.44E-06	1.42E-05	1.80E-05	4.90E-06	2.71E-05		--	--	--	--	2.43E-02	2.32E-02	Hexane
(b)(3)	EF31926A	Air Heater 1	17-158	--	--	3.61E-06	--	2.06E-06	1.29E-04	3.09E-03	--	--	1.96E-08	5.84E-06	--	8.59E-07	1.89E-06	2.40E-06	6.53E-07	3.61E-06	--	--	--	--	--	3.24E-03	3.09E-03	Hexane
(b)(3)	EF31927A	Air Heater 2	18-158	--	--	3.61E-06	--	2.06E-06	1.29E-04	3.09E-03	--	--	1.96E-08	5.84E-06	--	8.59E-07	1.89E-06	2.40E-06	6.53E-07	3.61E-06	--	--	--	--	--	3.24E-03	3.09E-03	Hexane
(b)(6)	EF31936A	**FBR3 Dehumidifier Air Heater 1**	22-158	--	--	3.61E-06	--	2.06E-06	1.29E-04	3.09E-03	--	--	1.96E-08	5.84E-06	--	8.59E-07	2.40E-06	2.40E-06	6.53E-07	3.61E-06	--	--	--	--	--	3.24E-03	3.09E-03	Hexane
(b)(6)	EF31937A	**FBR3 Dehumidifier Air Heater 2**	23-158	--	--	3.61E-06	--	2.06E-06	1.29E-04	3.09E-03	--	--	1.96E-08	5.84E-06	--	8.59E-07	2.40E-06	2.40E-06	6.53E-07	3.61E-06	--	--	--	--	--	3.24E-03	3.09E-03	Hexane
(b)(4)		Drover CWS air heaters		--	--	4.06E-05	--	2.32E-05	1.45E-03	3.48E-02	--	--	2.20E-07	6.57E-05	--	9.66E-06	2.13E-05	2.71E-05	7.34E-06	4.06E-05	--	--	--	--	--	3.65E-02	3.48E-02	Hexane
(c)	D1/D2/D3	3 Degreasing Operations		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	N/A	N/A
(f)		Gasoline fuel transfer dispensing operation		--	--	5.45E-03	--	--	--	5.00E-03	--	--	--	5.89E-03	1.62E-03	--	--	--	--	--	--	--	--	--	--	1.80E-02	5.89E-03	Toluene
(k)	T1	3 Acetic Acid Storage Tanks		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	N/A	N/A
(l)	T2	4 Hydrochloric Acid Storage Tanks		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.10	--	--	--	--	0.10	0.10	HCl
(m)		10 Small Batch Reactors		--	--	--	--	--	--	--	--	9.04	--	--	--	--	--	--	--	--	--	--	--	--	--	9.04	9.04	Propylene Oxide
(p)		50 portable diesel heaters		--	--	--	--	--	--	--	--	--	--	--	--	3.14E-02	1.05E-02	1.05E-02	2.09E-02	1.05E-02	--	1.39E-02	1.05E-02	1.05E-02	5.23E-02	0.17	5.23E-02	Selenium
			Total:	1.11E+02	5.49E-01	1.10E-02	5.54E-05	2.39E-03	2.33	3.59	6.2173823	9.08	2.61E-04	1.32E-02	2.02E-03	9.96E-04	2.19E-03	2.79E-03	7.57E-04	4.18E-03	0.10	0.01	0.01	0.01	0.05	**133.51**	**111.43**	**Acetaldehyde**

*Process HAP emissions from testing conducted February 23, 2016 on inlet and outlet of RTO Unit 5502-1D and scaled to maximum operating capacity.
Maximum Operating Capacity = 55,000 bushel/day ; Testing throughput = 53,077 bushels/day on February 23, 2016.

Appendix A: Emissions Calculations
HAPs Emissions - Controlled

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Permit List No.	Unit Number	Equipment Description	Stack	Controlled PTE (ton/yr) Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Dichlorobenzene	Formaldehyde	Hexane	Methanol	Propylene Oxide	Total PAH HAPs	Toluene	Xylene	Lead	Cadmium	Chromium	Manganese	Nickel	HCl	Arsenic	Beryllium	Mercury	Selenium	Total HAPs	Worst Single HAP	HAP
(a)	40-4	#1 Starch Flash Dryer (30 MMBtu/hr)	40-4	--	--	2.71E-04	--	1.55E-04	9.66E-03	2.32E-01	--	--	1.47E-06	4.38E-04	--	6.44E-05	1.42E-04	1.80E-04	4.90E-05	2.71E-04	--	--	--	--	--	0.24	0.23	Hexane
(b)	40-3	#2 Starch Flash Dryer (36 MMBtu/hr)	40-3	--	--	3.25E-04	--	1.86E-04	1.16E-02	2.78E-01	--	--	1.76E-06	5.26E-04	--	7.73E-05	1.70E-04	2.16E-04	5.87E-05	3.25E-04	--	--	--	--	--	0.29	0.28	Hexane
(c)	40-2	#3 Starch Flash Dryer (36 MMBtu/hr)	40-2	--	--	3.25E-04	--	1.86E-04	1.16E-02	2.78E-01	--	--	1.76E-06	5.26E-04	--	7.73E-05	1.70E-04	2.16E-04	5.87E-05	3.25E-04	--	--	--	--	--	0.29	0.28	Hexane
(d)	575-1	#4 Starch Flash Dryer (43 MMBtu/hr)	575-1	--	--	3.88E-04	--	2.22E-04	1.38E-02	3.32E-01	--	--	2.10E-06	6.28E-04	--	9.23E-05	2.03E-04	2.59E-04	7.02E-05	3.88E-04	--	--	--	--	--	0.35	0.33	Hexane
(e)	575-2	#5 Starch Flash Dryer (38 MMBtu/hr)	575-2	--	--	3.43E-04	--	1.96E-04	1.22E-02	2.94E-01	--	--	1.86E-06	5.55E-04	--	8.16E-05	1.79E-04	2.28E-04	6.20E-05	3.43E-04	--	--	--	--	--	0.31	0.29	Hexane
(f)	575-3	#6 Starch Flash Dryer (40 MMBtu/hr)	575-3	--	--	3.61E-04	--	2.06E-04	1.29E-02	3.09E-01	--	--	1.96E-06	5.84E-04	--	8.59E-05	1.89E-04	2.40E-04	6.53E-05	3.61E-04	--	--	--	--	--	0.32	0.31	Hexane
(g)	5549-1	#1 Spray Dryer (25 MMBtu/hr)	5549-1	--	--	2.25E-04	--	1.29E-04	8.05E-03	1.93E-01	--	--	1.22E-06	3.65E-04	--	5.37E-05	1.18E-04	1.50E-04	4.08E-05	2.25E-04	--	--	--	--	--	0.20	0.19	Hexane
(h)	5549-2	#2 Spray Dryer (25 MMBtu/hr)	5549-2	--	--	2.25E-04	--	1.29E-04	8.05E-03	1.93E-01	--	--	1.22E-06	3.65E-04	--	5.37E-05	1.18E-04	1.50E-04	4.08E-05	2.25E-04	--	--	--	--	--	0.20	0.19	Hexane
(i)*	5502-1A	Feed Dryer (77 MMBtu/hr)	5502-7	4.60	0.18	6.94E-04	--	3.97E-04	0.39	5.95E-01	0.53	--	3.77E-06	1.12E-03	--	1.65E-04	3.64E-04	4.63E-04	1.26E-04	6.94E-04	--	--	--	--	--	5.69	4.60	Acetaldehyde
(j)*	5502-1B	Germ Dryer (20 MMBtu/hr)	5502-7			1.80E-04	--	1.03E-04		1.55E-01		--	9.79E-07	2.92E-04	--	4.29E-05	9.45E-05	1.20E-04	3.26E-05	1.80E-04	--	--	--	--	--			
(k)*	5502-1C	Gluten Dryer (32 MMBtu/hr)	5502-7			2.89E-04	--	1.65E-04		2.47E-01		--	1.57E-06	4.67E-04	--	6.87E-05	1.51E-04	1.92E-04	5.22E-05	2.89E-04	--	--	--	--	--			
(l)*	5502-1D	RTO (18 MMBtu/hr)	5502-7			1.62E-04	--	9.28E-05		1.39E-01		--	8.81E-07	2.63E-04	--	3.86E-05	8.50E-05	1.08E-04	2.94E-05	1.62E-04	--	--	--	--	--			
(m)	5549-28	Spray Agglomerator #3	5549-28	--	--	2.25E-04	--	1.29E-04	8.05E-03	1.93E-01	--	--	1.22E-06	3.65E-04	--	5.37E-05	1.18E-04	1.50E-04	4.08E-05	2.25E-04	--	--	--	--	--	2.03E-01	0.19	Hexane
(kk)	5549-13	Agglomerator (includes 1.824 MMBtu/hr burner)	5549-13	--	--	1.64E-05	--	9.40E-06	5.87E-04	1.41E-02	--	--	8.93E-08	2.66E-05	--	3.92E-06	8.62E-06	1.10E-05	2.98E-06	1.64E-05	--	--	--	--	--	1.48E-02	0.01	Hexane
(ss)(52)	PAC-2	Distillation System	PAC-2	--	--	--	--	--	--	--	--	0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	0.002	0.002	Propylene Oxide
Insignificant Activities																												
(a)(1)	FP1	Emergency Fire Pump Engine		2.82E-04	3.40E-05	3.43E-04	1.44E-05	--	4.34E-04	--	--	--	6.17E-05	1.50E-04	1.05E-04	--	--	--	--	--	--	--	--	--	--	1.42E-03	4.34E-04	Formaldehyde
(a)(2)	FP2	Emergency Fire Pump Engine		4.03E-04	4.86E-05	4.90E-04	2.05E-05	--	6.20E-04	--	--	--	8.82E-05	2.15E-04	1.50E-04	--	--	--	--	--	--	--	--	--	--	2.03E-03	6.20E-04	Formaldehyde
(a)(3)	FP3	Emergency Fire Pump Engine		4.03E-04	4.86E-05	4.90E-04	2.05E-05	--	6.20E-04	--	--	--	8.82E-05	2.15E-04	1.50E-04	--	--	--	--	--	--	--	--	--	--	2.03E-03	6.20E-04	Formaldehyde
(b)(1)	YX31914A	Process Heater	158-6	--	--	4.60E-05	--	2.63E-05	1.64E-03	3.94E-02	--	--	2.50E-07	7.45E-05	--	1.10E-05	2.41E-05	3.07E-05	8.32E-06	4.60E-05	--	--	--	--	--	4.13E-02	3.94E-02	Hexane
(b)(2)	FH31924	FBR2 Burner	16-158	--	--	2.71E-05	--	1.55E-05	9.66E-04	2.32E-02	--	--	1.47E-07	4.38E-05	--	6.44E-06	1.42E-05	1.80E-05	4.90E-06	2.71E-05	--	--	--	--	--	2.43E-02	2.32E-02	Hexane
(b)(5)	FH31934	**FBR3 Burner**	21-158	--	--	2.71E-05	--	1.55E-05	9.66E-04	2.32E-02	-	-	1.47E-07	4.38E-05	0.00E+00	6.44E-06	1.42E-05	1.80E-05	4.90E-06	2.71E-05	0.00E+00	--	--	--	--	2.43E-02	2.32E-02	Hexane
(b)(3)	EF31926A	Air Heater 1	17-158	--	--	3.61E-06	--	2.06E-06	1.29E-04	3.09E-03	--	--	1.96E-08	5.84E-06	--	8.59E-07	1.89E-06	2.40E-06	6.53E-07	3.61E-06	--	--	--	--	--	3.24E-03	3.09E-03	Hexane
(b)(3)	EF31927A	Air Heater 2	18-158	--	--	3.61E-06	--	2.06E-06	1.29E-04	3.09E-03	--	--	1.96E-08	5.84E-06	--	8.59E-07	1.89E-06	2.40E-06	6.53E-07	3.61E-06	--	--	--	--	--	3.24E-03	3.09E-03	Hexane
(b)(6)	EF31936A	**FBR3 Dehumidifier Air Heater 1**	22-158	--	--	3.61E-06	--	2.06E-06	1.29E-04	3.09E-03	--	--	1.96E-08	5.84E-06	--	8.59E-07	2.40E-06	2.40E-06	6.53E-07	3.61E-06	--	--	--	--	--	3.24E-03	3.09E-03	Hexane
(b)(6)	EF31937A	**FBR3 Dehumidifier Air Heater 2**	23-158	--	--	3.61E-06	--	2.06E-06	1.29E-04	3.09E-03	--	--	1.96E-08	5.84E-06	--	8.59E-07	2.40E-06	2.40E-06	6.53E-07	3.61E-06	--	--	--	--	--	3.24E-03	3.09E-03	Hexane
(b)(4)		Drover CWS air heaters		--	--	4.06E-05	--	2.32E-05	1.45E-03	3.48E-02	--	--	2.20E-07	6.57E-05	--	9.66E-06	2.13E-05	2.71E-05	7.34E-06	4.06E-05	--	--	--	--	--	3.65E-02	3.48E-02	Hexane
(c)	D1/D2	2 Degreasing Operations		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	N/A	N/A
(f)		Gasoline fuel transfer dispensing operation		--	--	5.45E-03	--	--	--	5.00E-03	--	--	--	5.89E-03	1.62E-03	--	--	--	--	--	--	--	--	--	--	1.80E-02	5.89E-03	Toluene
(k)	T1	3 Acetic Acid Storage Tanks		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	N/A	N/A
(l)	T2	4 Hydrochloric Acid Storage Tanks		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	HCl
(m)		10 Small Batch Reactors		--	--	--	--	--	--	--	--	9.04	--	--	--	--	--	--	--	--	--	--	--	--	--	9.04	9.04	Propylene Oxide
(p)	0	50 portable diesel heaters	0	--	--	--	--	--	--	--	--	--	--	--	--	3.14E-02	1.05E-02	1.05E-02	2.09E-02	1.05E-02	--	1.39E-02	1.05E-02	1.05E-02	5.23E-02	0.17	0.05	Selenium
			Total:	4.60E+00	1.80E-01	1.10E-02	5.54E-05	2.39E-03	0.49	3.59	0.53	9.04	2.61E-04	1.32E-02	2.02E-03	9.96E-04	2.19E-03	2.79E-03	7.57E-04	4.18E-03	0.00	0.01	0.01	0.01	0.05	**17.50**	**9.04**	**Propylene Oxide**

*Process HAP emissions from testing conducted February 23, 2016 on inlet and outlet of RTO Unit 5502-1D.

Appendix A: Emissions Calculations
HAPs Emissions - Limited

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Permit List No.	Unit Number	Equipment Description	Stack	Limited PTE (ton/yr)																								HAP
				Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Dichlorobenzene	Formaldehyde	Hexane	Methanol	Propylene Oxide	Total PAH HAPs	Toluene	Xylene	Lead	Cadmium	Chromium	Manganese	Nickel	HCl	Arsenic	Beryllium	Mercury	Selenium	Total HAPs	Worst Single HAP	
(a)	40-4	#1 Starch Flash Dryer (30 MMBtu/hr)	40-4	--	--	2.71E-04	--	1.55E-04	9.66E-03	2.32E-01	--	--	1.47E-06	4.38E-04	--	6.44E-05	1.42E-04	1.80E-04	4.90E-05	2.71E-04	--	--	--	--	--	0.24	0.23	Hexane
(b)	40-3	#2 Starch Flash Dryer (36 MMBtu/hr)	40-3	--	--	3.25E-04	--	1.86E-04	1.16E-02	2.78E-01	--	--	1.76E-06	5.26E-04	--	7.73E-05	1.70E-04	2.16E-04	5.87E-05	3.25E-04	--	--	--	--	--	0.29	0.28	Hexane
(c)	40-2	#3 Starch Flash Dryer (36 MMBtu/hr)	40-2	--	--	3.25E-04	--	1.86E-04	1.16E-02	2.78E-01	--	--	1.76E-06	5.26E-04	--	7.73E-05	1.70E-04	2.16E-04	5.87E-05	3.25E-04	--	--	--	--	--	0.29	0.28	Hexane
(d)	575-1	#4 Starch Flash Dryer (43 MMBtu/hr)	575-1	--	--	3.88E-04	--	2.22E-04	1.38E-02	3.32E-01	--	--	2.10E-06	6.28E-04	--	9.23E-05	2.03E-04	2.59E-04	7.02E-05	3.88E-04	--	--	--	--	--	0.35	0.33	Hexane
(e)	575-2	#5 Starch Flash Dryer (38 MMBtu/hr)	575-2	--	--	3.43E-04	--	1.96E-04	1.22E-02	2.94E-01	--	--	1.86E-06	5.55E-04	--	8.16E-05	1.79E-04	2.28E-04	6.20E-05	3.43E-04	--	--	--	--	--	0.31	0.29	Hexane
(f)	575-3	#6 Starch Flash Dryer (40 MMBtu/hr)	575-3	--	--	3.61E-04	--	2.06E-04	1.29E-02	3.09E-01	--	--	1.96E-06	5.84E-04	--	8.59E-05	1.89E-04	2.40E-04	6.53E-05	3.61E-04	--	--	--	--	--	0.32	0.31	Hexane
(g)	5549-1	#1 Spray Dryer (25 MMBtu/hr)	5549-1	--	--	2.25E-04	--	1.29E-04	8.05E-03	1.93E-01	--	--	1.22E-06	3.65E-04	--	5.37E-05	1.18E-04	1.50E-04	4.08E-05	2.25E-04	--	--	--	--	--	0.20	0.19	Hexane
(h)	5549-2	#2 Spray Dryer (25 MMBtu/hr)	5549-2	--	--	2.25E-04	--	1.29E-04	8.05E-03	1.93E-01	--	--	1.22E-06	3.65E-04	--	5.37E-05	1.18E-04	1.50E-04	4.08E-05	2.25E-04	--	--	--	--	--	0.20	0.19	Hexane
(i)	5502-1A	Feed Dryer (77 MMBtu/hr)	5502-7	9.8*	**	6.94E-04	--	3.97E-04	**	5.95E-01	**	--	3.77E-06	1.12E-03	--	1.65E-04	3.64E-04	4.63E-04	1.26E-04	6.94E-04	--	--	--	--	--	12.79	9.80	Acetaldehyde
(j)	5502-1B	Germ Dryer (20 MMBtu/hr)	5502-7			1.80E-04	--	1.03E-04		1.55E-01		--	9.79E-07	2.92E-04	--	4.29E-05	9.45E-05	1.20E-04	3.26E-05	1.80E-04	--	--	--	--	--			
(k)	5502-1C	Gluten Dryer (32 MMBtu/hr)	5502-7			2.89E-04	--	1.65E-04		2.47E-01		--	1.57E-06	4.67E-04	--	6.87E-05	1.51E-04	1.92E-04	5.22E-05	2.89E-04	--	--	--	--	--			
(l)	5502-1D	RTO (18 MMBtu/hr)	5502-7			1.62E-04	--	9.28E-05		1.39E-01		--	8.81E-07	2.63E-04	--	3.86E-05	8.50E-05	1.08E-04	2.94E-05	1.62E-04	--	--	--	--	--			
(m)	5549-28	Spray Agglomerator #3	5549-28	--	--	2.25E-04	--	1.29E-04	8.05E-03	1.93E-01	--	--	1.22E-06	3.65E-04	--	5.37E-05	1.18E-04	1.50E-04	4.08E-05	2.25E-04	--	--	--	--	--	2.03E-01	0.00E+00	Hexane
(kk)	5549-13	Agglomerator (includes 1.824 MMBtu/hr burner)	5549-13	--	--	1.64E-05	--	9.40E-06	5.87E-04	1.41E-02	--	--	8.93E-08	2.66E-05	--	3.92E-06	8.62E-06	1.10E-05	2.98E-06	1.64E-05	--	--	--	--	--	1.48E-02	0.00E+00	Hexane
(ss)(52)	PAC-2	Distillation System	PAC-2	--	--	--	--	--	--	--	--	0.04	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04	0.04	Propylene Oxide
Insignificant Activities																												
(a)(1)	FP1	Emergency Fire Pump Engine		2.82E-04	3.40E-05	3.43E-04	1.44E-05	--	4.34E-04	--	--	--	6.17E-05	1.50E-04	1.05E-04	--	--	--	--	--	--	--	--	--	--	1.42E-03	4.34E-04	Formaldehyde
(a)(2)	FP2	Emergency Fire Pump Engine		4.03E-04	4.86E-05	4.90E-04	2.05E-05	--	6.20E-04	--	--	--	8.82E-05	2.15E-04	1.50E-04	--	--	--	--	--	--	--	--	--	--	2.03E-03	6.20E-04	Formaldehyde
(a)(3)	FP3	Emergency Fire Pump Engine		4.03E-04	4.86E-05	4.90E-04	2.05E-05	--	6.20E-04	--	--	--	8.82E-05	2.15E-04	1.50E-04	--	--	--	--	--	--	--	--	--	--	2.03E-03	6.20E-04	Formaldehyde
(b)(1)	YX31914A	Process Heater	158-6	--	--	4.60E-05	--	2.63E-05	1.64E-03	3.94E-02	--	--	2.50E-07	7.45E-05	--	1.10E-05	2.41E-05	3.07E-05	8.32E-06	4.60E-05	--	--	--	--	--	4.13E-02	3.94E-02	Hexane
(b)(2)	FH31924	FBR2 Burner	16-158	--	--	2.71E-05	--	1.55E-05	9.66E-04	2.32E-02	--	--	1.47E-07	4.38E-05	--	6.44E-06	1.42E-05	1.80E-05	4.90E-06	2.71E-05	--	--	--	--	--	2.43E-02	2.32E-02	Hexane
(b)(5)	FH31934	**FBR3 Burner**	21-158	--	--	2.71E-05	--	1.55E-05	9.66E-04	2.32E-02	-	-	1.47E-07	4.38E-05	0.00E+00	6.44E-06	1.42E-05	1.80E-05	4.90E-06	2.71E-05	0.00E+00	--	--	--	--	2.43E-02	2.32E-02	Hexane
(b)(3)	EF31926A	Air Heater 1	17-158	--	--	3.61E-06	--	2.06E-06	1.29E-04	3.09E-03	--	--	1.96E-08	5.84E-06	--	8.59E-07	1.89E-06	2.40E-06	6.53E-07	3.61E-06	--	--	--	--	--	3.24E-03	3.09E-03	Hexane
(b)(3)	EF31927A	Air Heater 2	18-158	--	--	3.61E-06	--	2.06E-06	1.29E-04	3.09E-03	--	--	1.96E-08	5.84E-06	--	8.59E-07	1.89E-06	2.40E-06	6.53E-07	3.61E-06	--	--	--	--	--	3.24E-03	3.09E-03	Hexane
(b)(6)	EF31936A	**FBR3 Dehumidifier Air Heater 1**	22-158	--	--	3.61E-06	--	2.06E-06	1.29E-04	3.09E-03	--	--	1.96E-08	5.84E-06	--	8.59E-07	2.40E-06	2.40E-06	6.53E-07	3.61E-06	--	--	--	--	--	3.24E-03	3.09E-03	Hexane
(b)(6)	EF31937A	**FBR3 Dehumidifier Air Heater 2**	23-158	--	--	3.61E-06	--	2.06E-06	1.29E-04	3.09E-03	--	--	1.96E-08	5.84E-06	--	8.59E-07	2.40E-06	2.40E-06	6.53E-07	3.61E-06	--	--	--	--	--	3.24E-03	3.09E-03	Hexane
(b)(4)		Drover CWS air heaters		--	--	4.06E-05	--	2.32E-05	1.45E-03	3.48E-02	--	--	2.20E-07	6.57E-05	--	9.66E-06	2.13E-05	2.71E-05	7.34E-06	4.06E-05	--	--	--	--	--	3.65E-02	3.48E-02	Hexane
(c)	D1/D2	2 Degreasing Operations		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	N/A	N/A
(f)		Gasoline fuel transfer dispensing operation		--	--	5.45E-03	--	--	--	5.00E-03	--	--	--	5.89E-03	1.62E-03	--	--	--	--	--	--	--	--	--	--	1.80E-02	5.89E-03	Toluene
(k)	T1	3 Acetic Acid Storage Tanks		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	N/A	N/A
(l)	T2	4 Hydrochloric Acid Storage Tanks		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.10	--	--	--	--	0.10	0.10	HCl
(m)		10 Small Batch Reactors		--	--	--	--	--	--	--	--	9.04	--	--	--	--	--	--	--	--	--	--	--	--	--	9.04	9.04	Propylene Oxide
(p)	0	50 portable diesel heaters	0	--	--	--	--	--	--	--	--	--	--	--	--	0.03	0.01	0.01	0.02	0.01	--	0.01	0.01	0.01	0.05	0.17	0.05	Selenium
			Total:	1.09E-03	1.31E-04	1.10E-02	5.54E-05	2.39E-03	0.10	3.59	0	9.08	2.61E-04	1.32E-02	2.02E-03	3.23E-02	1.26E-02	1.32E-02	2.17E-02	1.46E-02	0.10	0.01	0.01	0.01	0.05	**24.74**	**9.80**	**Acetaldehyde**

*Acetaldehyde shall be limited to less than 9.8 tons per year.
**Combined HAPS (acetaldehyde, acrolein, methanol, formaldehyde) shall be limited to less than 11.6 tons per year.

Appendix A: Emissions Calculations
Particulate Emission Units

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Unit Number	Equipment Description	Stack	Control Equipment	Gas or Air flow rate (dscfm)	Integral/ Inherent	Control Efficiency of Control Equipment	Outlet Grain Loading Limit (gr/dscf)	326 IAC 6.5	326 IAC 6.5 Limit	Other Limits	PTE After Controls (ton/yr)			PTE Before Controls (ton/yr)			Uncontrolled PTE for Part 70 Purposes (ton/yr)			Limited PTE for PSD Purposes (ton/yr)		
											PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5
5552-1	Product Storage Hopper	5552-1	BH: Particulate	2450	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.21 lb/hr, 0.92 tpy	0.92	0.92	0.92	91.98	91.98	91.98	0.92	0.92	0.92	0.92	0.92	0.92
5552-2	Product Transfer Hopper	5552-2	BH: Particulate	350	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.03 lb/hr, 0.13 tpy	0.13	0.13	0.13	13.14	13.14	13.14	0.13	0.13	0.13	0.13	0.13	0.13
5503-2	Germ Bin	5503-2	DCS (5503-5): Particulate	8,640	no	99%	0.01	6.5-1-2	0.03 gr/dscf	PSD Minor Limit: PM/PM10: 0.01 gr/dscf, 0.74 lb/hr, 3.24 tpy	3.24	3.24	3.24	324.37	324.37	324.37	324.37	324.37	324.37	3.24	3.24	3.24
5503-3	Pellet Bin #1	5503-2	DCS (5503-5): Particulate	w/5503-2	no	w/5503-2	w/5503-2	6.5-1-2	0.03 gr/dscf	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2
5503-4	Pellet Bin #2	5503-2	DCS (5503-5): Particulate	w/5503-2	no	w/5503-2	w/5503-2	6.5-1-2	0.03 gr/dscf	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2	w/5503-2
71-7	DSW Packing Fugitive Dust Collector	71-7	BH: Particulate	9,000	no	99%	0.030	6.5-1-2	0.03 gr/dscf	None	10.14	10.14	10.14	1013.66	1013.66	1013.66	1013.66	1013.66	1013.66	10.14	10.14	10.14
577-2	RSP North Packing Line	577-2	BH: Particulate	9,600	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor Limit: PM/PM10: 0.01 gr/dscf, 0.82 lb/hr, 3.59 tpy	3.60	3.60	3.60	360.41	360.41	360.41	3.60	3.60	3.60	3.59	3.59	3.60
5503-1	Gluten Receiver	5503-1	BH: Particulate	18,580	*	99.5%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor Limit: PM/PM10: 0.01 gr/dscf, 1.593 lb/hr, 6.977 tpy.	6.98	6.98	6.98	1395.09	1395.09	1395.09	6.98	6.98	6.98	6.977	6.977	6.98
5502-5	Pellet Cooler	5502-5	CY: Particulate	13,790	no	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor Limit: PM/PM10: 0.01 gr/dscf, 1.182 lb/hr, 5.177 tpy.	5.18	5.18	5.18	517.72	517.72	517.72	517.72	517.72	517.72	5.177	5.177	5.18
5502-6	Germ Cooler	5502-6	CY: Particulate	12,080	no	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor Limit: PM/PM10: 0.01 gr/dscf, 1.035 lb/hr, 4.533 tpy.	4.54	4.54	4.54	453.52	453.52	453.52	453.52	453.52	453.52	4.533	4.533	4.54
5502-4	2 Loose Feed Bins	5502-3	BH: Particulate	w/5502-3	no	w/5502-3	w/5502-3	6.5-1-2	0.03 gr/dscf	w/5502-3	w/5502-3	w/5502-3	w/5502-3	w/5502-3	w/5502-3	w/5502-3	w/5502-3	w/5502-3	w/5502-3	w/5502-3	w/5502-3	w/5502-3
5502-3	Hammer Mill	5502-3	BH: Particulate	11,700	no	99.5%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor Limit: PM/PM10: 0.01 gr/dscf, 1.003 lb/hr, 4.393 tpy.	4.39	4.39	4.39	878.50	878.50	878.50	878.50	878.50	878.50	4.393	4.393	4.39
42-10	DSE Bag Slitter	42-10	BH: Particulate	5,000	no	99%	0.030	6.5-6-25	0.030 gr/dscf, 2.4 tpy	None	5.63	5.63	5.63	563.14	563.14	563.14	563.14	563.14	563.14	2.40	5.63	5.63
577-5	RSP Hopper #4	577-5	BH: Particulate	4,500	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.386 lb/hr, 1.69 tpy	1.69	1.69	1.69	168.94	168.94	168.94	1.69	1.69	1.69	1.69	1.69	1.69
577-6	RSP Hopper #6	577-6	BH: Particulate	4,500	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.386 lb/hr, 1.69 tpy	1.69	1.69	1.69	168.94	168.94	168.94	1.69	1.69	1.69	1.69	1.69	1.69
577-7	RSP Hopper #5	577-7	BH: Particulate	4,500	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.386 lb/hr, 1.69 tpy	1.69	1.69	1.69	168.94	168.94	168.94	1.69	1.69	1.69	1.69	1.69	1.69
577-8	RSP Hopper #1	577-8	BH: Particulate	4,500	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.386 lb/hr, 1.69 tpy	1.69	1.69	1.69	168.94	168.94	168.94	1.69	1.69	1.69	1.69	1.69	1.69
577-9	RSP Hopper #2	577-9	BH: Particulate	4,500	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.386 lb/hr, 1.69 tpy	1.69	1.69	1.69	168.94	168.94	168.94	1.69	1.69	1.69	1.69	1.69	1.69
577-10	RSP Hopper #3	577-10	BH: Particulate	4,500	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.386 lb/hr, 1.69 tpy	1.69	1.69	1.69	168.94	168.94	168.94	1.69	1.69	1.69	1.69	1.69	1.69
71-1	Industrial Packer	71-1	BH: Particulate	5,300	no	90.0%	0.030	6.5-6-25	0.030 gr/dscf, 0.9 tpy	None	5.97	5.97	5.97	59.69	59.69	59.69	59.69	59.69	59.69	0.90	5.97	5.97
5549-3	Spray Dryer Products Receiver	5549-3	BH: Particulate	1,700	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.146 lb/hr, 0.64 tpy	0.64	0.64	0.64	63.82	63.82	63.82	0.64	0.64	0.64	0.64	0.64	0.64
5549-4	Spray Dryer Products Receiver	5549-4	BH: Particulate	1,700	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.146 lb/hr, 0.64 tpy	0.64	0.64	0.64	63.82	63.82	63.82	0.64	0.64	0.64	0.64	0.64	0.64
5549-7	Spray Dryer Storage Hopper #1	5549-7	BH: Particulate	450	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.039 lb/hr, 0.17 tpy	0.17	0.17	0.17	16.89	16.89	16.89	0.17	0.17	0.17	0.17	0.17	0.17
5549-8	Spray Dryer Storage Hopper #2	5549-8	BH: Particulate	450	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.039 lb/hr, 0.17 tpy	0.17	0.17	0.17	16.89	16.89	16.89	0.17	0.17	0.17	0.17	0.17	0.17
5549-9	Spray Dryer Storage Hopper #3	5549-9	BH: Particulate	450	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.039 lb/hr, 0.17 tpy	0.17	0.17	0.17	16.89	16.89	16.89	0.17	0.17	0.17	0.17	0.17	0.17
5549-10	Spray Dryer Storage Hopper #4	5549-10	BH: Particulate	450	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.039 lb/hr, 0.17 tpy	0.17	0.17	0.17	16.89	16.89	16.89	0.17	0.17	0.17	0.17	0.17	0.17

Appendix A: Emissions Calculations
Particulate Emission Units

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Unit Number	Equipment Description	Stack	Control Equipment	Gas or Air flow rate (dscfm)	Integral/ Inherent	Control Efficiency of Control Equipment	Outlet Grain Loading Limit (gr/dscf)	326 IAC 6.5	326 IAC 6.5 Limit	Other Limits	PTE After Controls (ton/yr)			PTE Before Controls (ton/yr)			Uncontrolled PTE for Part 70 Purposes (ton/yr)			Limited PTE for PSD Purposes (ton/yr)		
											PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5
5549-12	Agglomerator Feed storage bin	5549-12	BH: Particulate	1,530	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.13 lb/hr, 0.57 tpy	0.57	0.57	0.57	57.44	57.44	57.44	0.57	0.57	0.57	0.57	0.57	0.57
5549-13	Agglomerator (includes 1.824 MMBtu/hr burner)	5549-13	BH: Particulate	12,500	no	98.0%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: Input of starch to 5549-13 shall not exceed 14,010 ton/yr. Emission rate shall not exceed 0.61 lb PM/PM10/ton starch.	4.69	4.69	4.69	234.64	234.64	234.64	234.64	234.64	234.64	4.27	4.27	4.69
5549-14	Agglomerator Equipment Aspiration	5549-14	BH: Particulate	2,840	**	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.244 lb/hr, 1.07 tpy	1.07	1.07	1.07	106.62	106.62	106.62	106.62	106.62	106.62	1.07	1.07	1.07
5549-17	Bulk Bag Packer Filter Receiver	5549-17	BH: Particulate	450	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.04 lb/hr, 0.18 tpy	0.17	0.17	0.17	16.89	16.89	16.89	0.17	0.17	0.17	0.18	0.18	0.17
5549-18	Line 1 Middle Packer	5549-18	BH: Particulate	4,600	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.28 lb/hr, 1.23 tpy	1.73	1.73	1.73	172.70	172.70	172.70	1.73	1.73	1.73	1.23	1.23	1.73
5549-19	Line 1 North Packer	5549-19	BH: Particulate	5,400	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.24 lb/hr, 1.05 tpy	2.03	2.03	2.03	202.73	202.73	202.73	2.03	2.03	2.03	1.05	1.05	2.03
5549-20	#2 Fugitive Dust Collector	5549-20	BH: Particulate	14,000	no	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.93 lb/hr, 4.07 tpy	5.26	5.26	5.26	525.60	525.60	525.60	525.60	525.60	525.60	4.07	4.07	5.26
5549-21	Line 1 Fugitive Dust Collector	5549-21	BH: Particulate	14,000	no	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 1.2 lb/hr, 5.27 tpy	5.26	5.26	5.26	525.60	525.60	525.60	525.60	525.60	525.60	5.26	5.26	5.26
5549-26	Line 2 Packer	5549-26	BH: Particulate	5,400	*	99%	0.010	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.01 gr/dscf, 0.26 lb/hr, 1.16 tpy	2.03	2.03	2.03	202.73	202.73	202.73	2.03	2.03	2.03	1.14	1.14	2.03
56-1	Corn Dump Truck	56-1	BH: Particulate	35,000	no	99%	0.020	6.5-6-25	0.020 gr/dscf, 7.02 tpy	None	26.28	26.28	26.28	2628.00	2628.00	2628.00	2628.00	2628.00	2628.00	7.02	26.28	26.28
42-3A	DSE Hopper #9	6	BH: Particulate	3,600	*	99.0%	0.032	6.5-6-25	0.032 gr/dscf, 1.8 tpy	None	4.32	4.32	4.32	432.49	432.49	432.49	4.32	4.32	4.32	1.80	4.32	4.32
42-3B	DSE Hopper #10	7	BH: Particulate	3,600	*	99.0%	0.032	6.5-6-25	0.032 gr/dscf, 1.8 tpy	None	4.32	4.32	4.32	432.49	432.49	432.49	4.32	4.32	4.32	1.80	4.32	4.32
42-3C	DSE Hopper #11	43-3C	BH: Particulate	3,600	*	99.0%	0.032	6.5-6-25	0.032 gr/dscf, 1.8 tpy	None	4.32	4.32	4.32	432.49	432.49	432.49	4.32	4.32	4.32	1.80	4.32	4.32
42-3D	DSE Hopper #12	9	BH: Particulate	3,600	*	99.0%	0.032	6.5-6-25	0.032 gr/dscf, 1.8 tpy	None	4.32	4.32	4.32	432.49	432.49	432.49	4.32	4.32	4.32	1.80	4.32	4.32
42-3E	DSE Hopper #13	10	BH: Particulate	3,600	*	99.0%	0.032	6.5-6-25	0.032 gr/dscf, 1.8 tpy	None	4.32	4.32	4.32	432.49	432.49	432.49	4.32	4.32	4.32	1.80	4.32	4.32
42-3F	DSE Hopper #14	11	BH: Particulate	3,600	*	99.0%	0.032	6.5-6-25	0.032 gr/dscf, 1.8 tpy	None	4.32	4.32	4.32	432.49	432.49	432.49	4.32	4.32	4.32	1.80	4.32	4.32
42-7A	DSE Hopper #2	14	BH: Particulate	2,600	*	99.0%	0.032	6.5-6-25	0.032 gr/dscf, 1.7 tpy	None	3.12	3.12	3.12	312.36	312.36	312.36	3.12	3.12	3.12	1.70	3.12	3.12
42-7B	DSE Hopper #4	14	BH: Particulate	2,600	*	99.0%	0.032	6.5-6-25	0.032 gr/dscf, 1.7 tpy	None	3.12	3.12	3.12	312.36	312.36	312.36	3.12	3.12	3.12	1.70	3.12	3.12
42-7C	DSE Hopper #6	16	BH: Particulate	2,600	*	99.0%	0.032	6.5-6-25	0.032 gr/dscf, 1.7 tpy	None	3.12	3.12	3.12	312.36	312.36	312.36	3.12	3.12	3.12	1.70	3.12	3.12
42-8A	DSE Hopper #1	17A	BH: Particulate	2,000	**	99.0%	0.03	6.5-6-25	0.030 gr/dscf, 4.2 tpy	None	2.25	2.25	2.25	225.26	225.26	225.26	225.26	225.26	225.26	4.20	2.25	2.25
42-8B	DSE Hopper #3	17B	BH: Particulate	2,000	**	99.0%	0.03			None	2.25	2.25	2.25	225.26	225.26	225.26	225.26	225.26	225.26		2.25	2.25
42-8C	DSE Hopper #5	17C	BH: Particulate	2,000	**	99.0%	0.03			None	2.25	2.25	2.25	225.26	225.26	225.26	225.26	225.26	225.26		2.25	2.25
42-8D	DSE Hopper #7	17D	BH: Particulate	2,000	**	99.0%	0.03			None	2.25	2.25	2.25	225.26	225.26	225.26	225.26	225.26	225.26		2.25	2.25
63-1A	CWS #8	46A	BH: Particulate	2,400	*	99.0%	0.03	6.5-1-2	0.03 gr/dscf	None	2.70	2.70	2.70	270.31	270.31	270.31	2.70	2.70	2.70	2.70	2.70	2.70
63-17	CWS South Mill	53	BH: Particulate	5,000	**	99.0%	0.03	6.5-1-2	0.03 gr/dscf	None	5.63	5.63	5.63	563.14	563.14	563.14	563.14	563.14	563.14	5.63	5.63	5.63
56-2	Grain Elevator	24	BH: Particulate	30,000	**	99.0%	0.01	6.5-6-25	0.010 gr/dscf, 11.3 tpy	None	11.26	11.26	11.26	1126.29	1126.29	1126.29	1126.29	1126.29	1126.29	11.30	11.26	11.26
152-1	Starch Mixer 1 Filter Receiver	152-1	BH: Particulate	500	*	99.0%	0.03	6.5-1-2	0.03 gr/dscf	None	0.56	0.56	0.56	56.31	56.31	56.31	0.56	0.56	0.56	0.56	0.56	0.56
152-2	Mixer 1 Baghouse	152-2	BH: Particulate	1,000	*	99.0%	0.03	6.5-1-2	0.03 gr/dscf	None	1.13	1.13	1.13	112.63	112.63	112.63	1.13	1.13	1.13	1.13	1.13	1.13
152-4	Starch Mixer 2 Filter/Receiver (Bld 852A)	152-4	BH: Particulate	600	*	99.0%	0.03	6.5-1-2	0.03 gr/dscf	None	0.68	0.68	0.68	67.58	67.58	67.58	0.68	0.68	0.68	0.68	0.68	0.68
152-5	Starch Mixer 2 (Bld 852A)	152-5	BH: Particulate	1,000	*	99.0%	0.03	6.5-1-2	0.03 gr/dscf	None	1.13	1.13	1.13	112.63	112.63	112.63	1.13	1.13	1.13	1.13	1.13	1.13
152-6	Starch Storage Hopper	152-6	BH: Particulate	850	**	99.0%	0.03	6.5-1-2	0.03 gr/dscf	None	0.96	0.96	0.96	95.73	95.73	95.73	95.73	95.73	95.73	0.96	0.96	0.96
152-7	Starch Filter/Receiver 2 Bld 852	152-7	BH: Particulate	500	**	99.0%	0.03	6.5-1-2	0.03 gr/dscf	PSD Minor: PM: 0.43 lb/hr; PM10: 0.30 lb/hr; PM2.5: 0.17 lb/hr	0.56	0.56	0.56	56.31	56.31	56.31	56.31	56.31	56.31	0.563	1.314	0.745
152-8	Starch Mixer 4 Bld 852A Filter Receiver	152-8	BH: Particulate	600	**	99.0%	0.03	6.5-1-2	0.03 gr/dscf	PSD Minor: PM: 0.52 lb/hr; PM10: 0.36 lb/hr; PM2.5: 0.21 lb/hr	0.68	0.68	0.68	67.58	67.58	67.58	67.58	67.58	67.58	0.676	1.577	0.920
152-9	Starch Mixer 4 Bld 852A	152-9	BH: Particulate	20	**	99.0%	0.03	6.5-1-2	0.03 gr/dscf	PSD Minor: PM: 0.10 lb/hr; PM10: 0.05 lb/hr; PM2.5: 0.05 lb/hr	0.02	0.02	0.02	2.25	2.25	2.25	2.25	2.25	2.25	0.023	0.219	0.219
152-10	Starch Mixer 3 Bld 852A Filter Receiver	152-10	BH: Particulate	600	**	99.0%	0.03	6.5-1-2	0.03 gr/dscf	PSD Minor: PM: 0.52 lb/hr; PM10: 0.36 lb/hr; PM2.5: 0.21 lb/hr	0.68	0.68	0.68	67.58	67.58	67.58	67.58	67.58	67.58	0.676	1.577	0.920

Appendix A: Emissions Calculations
Particulate Emission Units

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Unit Number	Equipment Description	Stack	Control Equipment	Gas or Air flow rate (dscfm)	Integral/ Inherent	Control Efficiency of Control Equipment	Outlet Grain Loading Limit (gr/dscf)	326 IAC 6.5	326 IAC 6.5 Limit	Other Limits	PTE After Controls (ton/yr)			PTE Before Controls (ton/yr)			Uncontrolled PTE for Part 70 Purposes (ton/yr)			Limited PTE for PSD Purposes (ton/yr)		
											PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5
152-11	Starch Mixer 3 Bld 852A	152-11	BH: Particulate	1,000	*	99.0%	0.03	6.5-1-2	0.03 gr/dscf	PSD Minor: PM: 0.86 lb/hr; PM10: 0.60 lb/hr; PM2.5: 0.34 lb/hr	1.13	1.13	1.13	112.63	112.63	112.63	1.13	1.13	1.13	1.126	2.628	1.489
152-12	Bulk Bag Receiver	152-12	BH: Particulate	800	*	99.0%	0.03	6.5-1-2	0.03 gr/dscf	PSD Minor: PM: 0.69 lb/hr; PM10: 0.48 lb/hr; PM2.5: 0.28 lb/hr	0.90	0.90	0.90	90.10	90.10	90.10	0.90	0.90	0.90	0.901	2.102	1.226
TF41820 (formerly 61-21)	Starch Storage Silo #2 Receiver	152-3	BH: Particulate	589	*	99.0%	0.03	6.5-1-2	0.03 gr/dscf	PSD Minor: PM: 0.55 lb/hr; PM10: 0.33 lb/hr; PM2.5: 0.22 lb/hr	0.66	0.66	0.66	66.34	66.34	66.34	0.66	0.66	0.66	0.66	1.45	0.96
TF41818 (formerly 581-2)	Starch Cooling and Conveying System	TF41818	BH: Particulate	14,000	*	99.0%	0.03	6.5-1-2	0.03 gr/dscf	PSD Minor: PM: 3.97 lb/hr; PM10: 2.38 lb/hr; PM2.5: 1.59 lb/hr	15.77	15.77	15.77	1576.80	1576.80	1576.80	15.77	15.77	15.77	15.77	10.42	6.96
152-15 (formerly TF41819)	Blending Bin	DC41819	BH: Particulate	4,000	*	99.0%	0.03	6.5-1-2	0.03 gr/dscf	PSD Minor: PM: 1.12 lb/hr; PM10: 0.67 lb/hr; PM2.5: 0.45 lb/hr	4.51	4.51	4.51	450.51	450.51	450.51	4.51	4.51	4.51	4.51	2.93	1.97
128-3	Starch Hopper D/C	128-3	BH: Particulate	1,100	*	99.0%	0.03	6.5-1-2	0.03 gr/dscf	None	1.24	1.24	1.24	123.89	123.89	123.89	1.24	1.24	1.24	1.24	1.24	1.24
40-1A	Sodium Sulfate Conveying System Silo	40-1A	BH: Particulate	1,400	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10/PM2.5: 0.13 lb/hr	1.58	1.58	1.58	157.68	157.68	157.68	1.58	1.58	1.58	0.569	0.569	0.569
40-1B	Sodium Sulfate Conveying System Receiver	40-1B	BH: Particulate	1,250	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10/PM2.5: 0.13 lb/hr	1.41	1.41	1.41	140.79	140.79	140.79	1.41	1.41	1.41	0.569	0.569	0.569
42-1	DSE North Packer	5	BH: Particulate	10,320	*	99.0%	0.030	6.5-6-25	0.030 gr/dscf, 0.9 tpy	None	11.62	11.62	11.62	1162.33	1162.33	1162.33	11.62	11.62	11.62	0.90	11.62	11.62
42-4	DSE Hopper #8	17E	BH: Particulate	4,200	*	99.0%	0.029	6.5-6-25	0.029 gr/dscf, 2.3 tpy	None	4.57	4.57	4.57	457.27	457.27	457.27	4.57	4.57	4.57	2.30	4.57	4.57
42-6	DSE Negative Receiver	13	BH: Particulate	2,400	*	99.0%	0.030	6.5-6-25	0.030 gr/dscf, 2.5 tpy	None	2.70	2.70	2.70	270.31	270.31	270.31	2.70	2.70	2.70	2.50	2.70	2.70
42-9	DSE South Packer	18	BH: Particulate	10,320	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	11.62	11.62	11.62	1162.33	1162.33	1162.33	11.62	11.62	11.62	11.62	11.62	11.62
42-11	DSE Railcar Loading - East Track	20	BH: Particulate	2,500	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	2.82	2.82	2.82	281.57	281.57	281.57	2.82	2.82	2.82	2.82	2.82	2.82
42-12	DSE Railcar Loading - West Track	21	BH: Particulate	2,500	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	2.82	2.82	2.82	281.57	281.57	281.57	2.82	2.82	2.82	2.82	2.82	2.82
42-13	DSE Bulk Bag System	106	BH: Particulate	4500	*	99.0%	0.0300	6.5-1-2	0.03 gr/dscf	PSD Minor: PM: 0.50 lb/hr; PM10: 0.10 lb/hr; PM2.5: 0.10 lb/hr	5.07	5.07	5.07	506.83	506.83	506.83	5.07	5.07	5.07	2.190	0.438	0.438
61-14	Dextrin Blend	61-14	BH: Particulate	1,290	**	99.0%	0.028	6.5-6-25	0.028 gr/dscf, 1.2 tpy	None	1.36	1.36	1.36	135.60	135.60	135.60	135.60	135.60	135.60	1.20	1.36	1.36
63-3	CWS #7 Dryer Receiver	47	BH: Particulate	2,000	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	2.25	2.25	2.25	225.26	225.26	225.26	2.25	2.25	2.25	2.25	2.25	2.25
63-5	CWS North Product	49	BH: Particulate	7,000	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	7.88	7.88	7.88	788.40	788.40	788.40	7.88	7.88	7.88	7.88	7.88	7.88
63-9	CWS Packer	50	BH: Particulate	1,094	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	1.23	1.23	1.23	123.22	123.22	123.22	1.23	1.23	1.23	1.23	1.23	1.23
63-15	CWS #9 and #10 Dryers Receiver	52	BH: Particulate	3,600	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	4.05	4.05	4.05	405.46	405.46	405.46	4.05	4.05	4.05	4.05	4.05	4.05
63-16A	CWS #11 Dryer	54A	BH: Particulate	3,300	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	3.72	3.72	3.72	371.67	371.67	371.67	3.72	3.72	3.72	3.72	3.72	3.72
63-16B	CWS #12 and #13 Dryers	54B	BH: Particulate	3,300	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	3.72	3.72	3.72	371.67	371.67	371.67	3.72	3.72	3.72	3.72	3.72	3.72
63-20	DSW Negative Receiver	56	BH: Particulate	1,100	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	1.24	1.24	1.24	123.89	123.89	123.89	1.24	1.24	1.24	1.24	1.24	1.24
71-3	Negative Receiver	71-3	BH: Particulate	7,500	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	8.45	8.45	8.45	844.71	844.71	844.71	8.45	8.45	8.45	8.45	8.45	8.45
71-5A	DSW Hopper #1	59	BH: Particulate	600	*	99.0%	0.026	6.5-1-2	0.026 gr/dscf, 0.3 tpy	None	0.59	0.59	0.59	58.57	58.57	58.57	0.59	0.59	0.59	0.30	0.59	0.59
71-5B	DSW Hopper #2	60	BH: Particulate	600	*	99.0%	0.026	6.5-1-2	0.026 gr/dscf, 0.3 tpy	None	0.59	0.59	0.59	58.57	58.57	58.57	0.59	0.59	0.59	0.30	0.59	0.59
71-5D	DSW Hopper #4	62	BH: Particulate	600	*	99.0%	0.026	6.5-6-25	0.026 gr/dscf, 0.3 tpy	None	0.59	0.59	0.59	58.57	58.57	58.57	0.59	0.59	0.59	0.30	0.59	0.59
71-5F	DSW Hopper #6	64	BH: Particulate	600	*	99.0%	0.026	6.5-6-25	0.026 gr/dscf, 0.3 tpy	None	0.59	0.59	0.59	58.57	58.57	58.57	0.59	0.59	0.59	0.30	0.59	0.59
71-5K	DSW Hopper #11	69	BH: Particulate	1,200	*	99.0%	0.026	6.5-6-25	0.026 gr/dscf, 0.3 tpy	None	1.17	1.17	1.17	117.13	117.13	117.13	1.17	1.17	1.17	0.30	1.17	1.17
71-5L	DSW Hopper #12	70	BH: Particulate	1,200	*	99.0%	0.026	6.5-6-25	0.026 gr/dscf, 0.3 tpy	None	1.17	1.17	1.17	117.13	117.13	117.13	1.17	1.17	1.17	0.30	1.17	1.17
71-8	DSW Bulk Car Loading	72	BH: Particulate	2,000	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	2.25	2.25	2.25	225.26	225.26	225.26	2.25	2.25	2.25	2.25	2.25	2.25
577-1	RSP South Bulk Bag Packing	77	BH: Particulate	3,800	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	4.28	4.28	4.28	427.99	427.99	427.99	4.28	4.28	4.28	4.28	4.28	4.28
FA-60582	FG Bulk Bag Bin Vent Bld 800	FA-60582	BH: Particulate	3,800	**	99.0%	0.030	6.5-1-2	0.03 gr/dscf	PSD Minor: PM: 1.63 lb/hr; PM10: 0.80 lb/hr; PM2.5: 0.65 lb/hr	4.28	4.28	4.28	427.99	427.99	427.99	427.99	427.99	427.99	4.280	3.504	2.847
577-3	RSP South Packing Line	79	BH: Particulate	10,000	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	11.26	11.26	11.26	1126.29	1126.29	1126.29	11.26	11.26	11.26	11.26	11.26	11.26
577-4	RSP Bulk Loading System A	80	BH: Particulate	1,750	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	1.97	1.97	1.97	197.10	197.10	197.10	1.97	1.97	1.97	1.97	1.97	1.97
577-4A	RSP Bulk Loading Fugitive Dust Collector	81	BH: Particulate	1,200.0	**	99%	0.002	6.5-1-2	0.03 gr/dscf	None	0.08	0.08	0.08	8.11	8.11	8.11	8.11	8.11	8.11	0.08	0.08	0.08
578-1	CWS Conveying Cyclone Operation[4]	578-1	BH: Particulate	4,000	**	99.00%	0.030	6.5-1-2	0.03 gr/dscf	None	4.51	4.51	4.51	450.51	450.51	450.51	450.51	450.51	450.51	4.51	4.51	4.51
578-2	CWS Packing Hopper	89	BH: Particulate	1,750	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	1.97	1.97	1.97	197.10	197.10	197.10	1.97	1.97	1.97	1.97	1.97	1.97
578-3	CWS Milling System	578-3	BH: Particulate	6,150	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	6.93	6.93	6.93	692.67	692.67	692.67	6.93	6.93	6.93	6.93	6.93	6.93
DC700	Product Receiver Drum A	578-4	N/A	1750		0.0%	0.010	6.5-1-2	0.03 gr/dscf	none	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
DC701	Product Receiver Drum B	578-5	N/A	1750		0.0%	0.010	6.5-1-2	0.03 gr/dscf	none	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
TF31993 (formerly TF31901)	Product Bin 93	1-158	BH: Particulate	3,000	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	3.38	3.38	3.38	337.89	337.89	337.89	3.38	3.38	3.38	3.38	3.38	3.38
TF31992 (formerly TF31902)	Product Bin 92	2-158	BH: Particulate	2,000	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	2.25	2.25	2.25	225.26	225.26	225.26	2.25	2.25	2.25	2.25	2.25	2.25
TF31991	Product Bin 91	3-158	BH: Particulate	2,000	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	2.25	2.25	2.25	225.26	225.26	225.26	2.25	2.25	2.25	2.25	2.25	2.25
SH31913	Surge Tank Bin 158-3	7-158	BH: Particulate	200	**	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	0.23	0.23	0.23	22.53	22.53	22.53	22.53	22.53	22.53	0.23	0.23	0.23
DC-31900	Bulk Bag Unload Bin 158-4	8-158	DCS: Particulate	600	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	0.68	0.68	0.68	67.58	67.58	67.58	0.68	0.68	0.68	0.68	0.68	0.68
TR31912	FBR1 Exhaust	5-158	MF: Particulate	8,800	**	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	9.91	9.91	9.91	991.13	991.13	991.13	991.13	991.13	991.13	9.91	9.91	9.91

Appendix A: Emissions Calculations
Particulate Emission Units

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Unit Number	Equipment Description	Stack	Control Equipment	Gas or Air flow rate (dscfm)	Integral/ Inherent	Control Efficiency of Control Equipment	Outlet Grain Loading Limit (gr/dscf)	326 IAC 6.5	326 IAC 6.5 Limit	Other Limits	PTE After Controls (ton/yr)			PTE Before Controls (ton/yr)			Uncontrolled PTE for Part 70 Purposes (ton/yr)			Limited PTE for PSD Purposes (ton/yr)		
											PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5
TR31913	FBR1 Cooling System	9-158	CY and BH: Particulate	20000	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10/PM2.5: 1.71 lb/hr	22.53	22.53	22.53	2252.57	2252.57	2252.57	22.53	22.53	22.53	7.49	7.49	7.49
T-1	Starch Dryer	T-1	CY and DCS: Particulate	500	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	None	0.56	0.56	0.56	56.31	56.31	56.31	0.56	0.56	0.56	0.56	0.56	0.56
5549-22	Line 1 South Packing Hopper	5549-22	BH: Particulate	4,800	*	99.9%	0.030	6.5-1-2	0.03 gr/dscf	None	5.41	5.41	5.41	5406.17	5406.17	5406.17	5.41	5.41	5.41	5.41	5.41	5.41
TF31980	Base Bin 80	10-158	BH: Particulate	1,275	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10/PM2.5: 0.055 lb/hr	1.44	1.44	1.44	143.60	143.60	143.60	1.44	1.44	1.44	0.241	0.241	0.241
TF31981	Base Bin 81	11-158	BH: Particulate	1,275	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10/PM2.5: 0.055 lb/hr	1.44	1.44	1.44	143.60	143.60	143.60	1.44	1.44	1.44	0.241	0.241	0.241
TF31982	Base Bin 82	12-158	BH: Particulate	1,275	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10/PM2.5: 0.055 lb/hr	1.44	1.44	1.44	143.60	143.60	143.60	1.44	1.44	1.44	0.241	0.241	0.241
TR31922	FBR2 Exhaust	14-158	MF: Particulate	6,000	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10/PM2.5: 0.514 lb/hr	6.76	6.76	6.76	675.77	675.77	675.77	6.76	6.76	6.76	2.251	2.251	2.251
TR31923	FBR2 Cooling Reactor	15-158	MF: Particulate	4,300	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10/PM2.5: 0.369 lb/hr	4.84	4.84	4.84	484.30	484.30	484.30	4.84	4.84	4.84	1.616	1.616	1.616
TF31990	Product Bin 90	13-158	MF: Particulate	2200	*	99.0%	0.030	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10/PM2.5: 0.094 lb/hr	2.48	2.48	2.48	247.78	247.78	247.78	2.48	2.48	2.48	0.412	0.412	0.412
TF41822	Base Bin	152-13	BH: Particulate	2060	*	99.0%	0.020	6.5-1-2	0.03 gr/dscf	None	1.55	1.55	1.55	154.68	154.68	154.68	1.55	1.55	1.55	1.55	1.55	1.55

Controls: BH = Baghouse, CY = Cyclone, DCS = Dust Collection System, MF = Metal Filter, RTO = Regenerative Thermal Oxidizer, WS = Wet Scrubber
*Control has been determined to be both integral and inherent to the process.
**Control has been determined to be inherent to the process.

Methodology
PTE After Controls (ton/yr) = Gas or Air Flow Rate (dscfm) x Outlet Grain Loading Limit (gr/dscf) x (60 min/hr) x (8760 hr/yr) x (1 lb/7000 gr) x (1 ton/2000 lb)
PTE Before Controls (ton/yr) = PTE After Controls / (1 - Control Efficiency)
Uncontrolled PTE for Part 70 Purposes (ton/yr):
For units with integral to the process controls, Uncontrolled PTE for Part 70 Purposes = PTE After Controls
For units without integral to the process controls, Uncontrolled PTE for Part 70 Purposes = PTE Before Controls
Limited PTE for PSD Purposes (ton/yr):
Limited PTE is based on PSD Minor Limits, if applicable or based on 326 IAC 6.5 limits.
The unit has a specific limit for this pollutant.
The unit does not have a specific limit for this pollutant. However, a control device is required to meet a limit for PM and/or PM10, so the PTE is being shown after control.

Unit Number	Equipment Description	Stack	Control Equipment	Gas or Air flow rate (dscfm)	Integral/ Inherent	Control Efficiency of Control Equipment	Outlet Grain Loading Limit (gr/dscf)	326 IAC 6.5	Limit	Other Limits	Emission Factor (lb/ton)	Max Produc-tion Rate (ton/hr)	PTE After Controls (ton/yr)			PTE Before Controls (ton/yr)			Uncontrolled PTE for Part 70 Purposes (ton/yr)			Limited PTE for PSD Purposes (ton/yr)		
													PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5
54-1	P-6 Rework Station	54-1	Baghouse: particulate	5,000	no	99.00%	0.03	6.5-1-2	0.03 gr/dscf	None	0.87	7.50	0.29	0.29	0.29	28.58	28.58	28.58	28.58	28.58	28.58	5.63	5.63	5.63

Methodology
Emission Factor from AP-42, Section 9.9.7, Corn Wet Milling, Table 9.9.7-1 for Grain Handling
PTE Before Controls (ton/yr) = Emission Factor (lb/ton) x Maximum Production Rate (ton/yr) x (8760 hr/yr) x (1 ton/2000 lb)
PTE After Controls (ton/yr) = PTE Before Controls x (1 - Control Efficiency)
Uncontrolled PTE for Part 70 Purposes (ton/yr) = PTE Before Controls (ton/yr)
Limited PTE PM for PSD Purposes (ton/yr) = Gas or Air Flow Rate (dscfm) x Outlet Grain Loading Limit (gr/dscf) x (60 min/hr) x (8760 hr/yr) x (1 lb/7000 gr) x (1 ton/2000 lb)
Limited PTE PM10 and PM2.5 set equal to Limited PTE PM. While the unit doesn't have specific PM10 and PM2.5 limits, a control device is required to meet the limit for PM, so the PTE is being shown the same as for PM.

Appendix A: Emissions Calculations
Particulate Emission Units

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Unit Number	Equipment Description	Stack	Control Equipment	Gas or Air flow rate (dscfm)	Integral/ Inherent	Control Efficiency of Control Equipment	Outlet Grain Loading Limit (gr/dscf)	326 IAC 6.5	326 IAC 6.5 Limit	Other Limits	PTE After Controls (ton/yr)			PTE Before Controls (ton/yr)			Uncontrolled PTE for Part 70 Purposes (ton/yr)			Limited PTE for PSD Purposes (ton/yr)		
											PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5

Unit Number	Equipment Description	Stack	Control Equipment	Uncontrolled Emission Factor (lb/ton)[1]	Maximum Product Throughput (ton/hr)*	Uncontrolled Potential to Emit PM/PM10/PM2.5 (lb/hr)	Uncontrolled Potential to Emit PM/PM10/PM2.5 (ton/yr)	Control Efficiency (%)	Controlled Potential to Emit PM/PM10/PM 2.5 (lb/hr)	Controlled Potential to Emit PM/PM10/PM2.5 (ton/yr)
TF34031	DSW Product Silo	S34031	BH: Particulate	3.14	1.55	4.87	21.32	99.99%	4.87E-04	2.13E-03
TF34032	DSW Product Silo	S34032	BH: Particulate	3.14	1.55	4.87	21.32	99.99%	4.87E-04	2.13E-03
TF34033	DSW Product Silo	S34033	BH: Particulate	3.14	1.55	4.87	21.32	99.99%	4.87E-04	2.13E-03
TF34034	DSW Product Silo	S34034	BH: Particulate	3.14	1.55	4.87	21.32	99.99%	4.87E-04	2.13E-03

* There is a process bottleneck of 3100 pounds per hour (1.55 ton/hr), although the silos are capable of processing 1.75 tons per hour, each.

Methodology

[1] Emission factor from AP 42 Chapter 11.12 Table 11.12-2 Concrete Batching
Uncontrolled Potential to Emit PM/PM10/PM2.5 (lb/hr) = Uncontrolled Emission Factor (lb/ton) * Maximum Product Throughput (ton/hr)
Uncontrolled Potential to Emit PM/PM10/PM2.5 (ton/yr) = Uncontrolled Potential to Emit PM/PM10/PM2.5 (lb/hr) * 8760 hours/1 year * 1ton/2000 lbs
Controlled Potential to Emit PM/PM10/PM2.5 (lb/hr) = Uncontrolled Potential to Emit PM/PM10/PM2.5 (lb/hr) * (1-Control Efficiency (%))
Controlled Potential to Emit PM/PM10/PM2.5 (ton/yr) = Uncontrolled Potential to Emit PM/PM10/PM2.5 (ton/yr) * (1-Control Efficiency (%))

Unit Number	Equipment Description	Stack	Control Equipment	Gas or Air flow rate (dscfm)	Integral/ Inherent	Control Efficiency of Control Equipment	Outlet Grain Loading Limit (gr/dscf)	326 IAC 6.5	326 IAC 6.5 Limit	Other Limits	PTE After Controls (ton/yr)			PTE Before Controls (ton/yr)			Uncontrolled PTE for Part 70 Purposes (ton/yr)		
											PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5
TF31994	Product Bin 94	24-158	BH: Particulate	2200	no	99.0%	0.01	6.5-1-2	0.03 gr/dscf	none	0.83	0.83	0.83	82.59	82.59	82.59	0.83	0.83	0.83
TF31983	Base Bin 83	24-158	BH: Particulate	1,275	no	99.0%	0.01	6.5-1-2	0.03 gr/dscf	none	0.48	0.48	0.48	47.87	47.87	47.87	0.48	0.48	0.48
TR31932	FBR3 Reactor	19-158	MF: Particulate	6,000	*	99.0%	0.01	6.5-1-2	0.03 gr/dscf	none	2.25	2.25	2.25	225.26	225.26	225.26	2.25	2.25	2.25
TR31933	FBR3 Cooling Reactor	20-158	MF: Particulate	4,300	*	99.0%	0.01	6.5-1-2	0.03 gr/dscf	none	1.61	1.61	1.61	161.43	161.43	161.43	1.61	1.61	1.61

Controls: BH = Baghouse, CY = Cyclone, DCS = Dust Collection System, MF = Metal Filter, RTO = Regenerative Thermal Oxidizer, WS = Wet Scrubber
*Control has been determined to be both integral and inherent to the process.
**Control has been determined to be inherent to the process.

Methodology

PTE After Controls (ton/yr) = Gas or Air Flow Rate (dscfm) x Outlet Grain Loading Limit (gr/dscf) x (60 min/hr) x (8760 hr/yr) x (1 lb/7000 gr) x (1 ton/2000 lb)
PTE Before Controls (ton/yr) = PTE After Controls / (1 - Control Efficiency)
Uncontrolled PTE for Part 70 Purposes (ton/yr):
For units with integral to the process controls, Uncontrolled PTE for Part 70 Purposes = PTE After Controls
For units without integral to the process controls, Uncontrolled PTE for Part 70 Purposes = PTE Before Controls
Limited PTE for PSD Purposes (ton/yr):
Limited PTE is based on PSD Minor Limits, if applicable or based on 326 IAC 6.5 limits.
The unit has a specific limit for this pollutant.
The unit does not have a specific limit for this pollutant. However, a control device is required to meet a limit for PM and/or PM10, so the PTE is being shown after control.

Appendix A: Emissions Calculations
Commerical/Institutional/Residential Combustors (<100 mmBtu/hr)
#1 and #2 Fuel Oil

Company Name: **Ingredion Incorporated Indianapolis Plant**
Source Address: **1515 South Drover Street, Indianapolis, IN 46221**
Permit Number: **097-43933-00042**
Reviewer: **Taylor Wade**

Thirty-one (31) Diesel Heaters each with a heat input capacity of 0.41 MMBtu/hr

Heat Input Capacity MMBtu/hr	Potential Throughput kgals/year	S = Weight % Sulfur
12.71	795.28	0.0015

	Pollutant						
	PM*	PM10**	direct PM2.5***	SO2	Nox	VOC	CO
Emission Factor in lb/kgal	2.0	2.38	2.13	0.213	20.0	0.34	5.0
Potential Emission in tons/yr	0.80	0.95	0.85	0.08	7.95	0.14	1.99

Methodology
1 gallon of No. 2 Fuel Oil has a heating value of 140,000 Btu
Potential Throughput (kgals/year) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1kgal per 1000 gallon x 1 gal per 0.140 MM Btu
Emission Factors are from AP 42, Tables 1.3-1, 1.3-2, and 1.3-3 (SCC 1-03-005-01/02/03) Supplement E 9/98 (see erata file)
*PM emission factor is filterable PM only.
**PM10 emission factor is filterable PM10 of 1.08 lb/kgal + condensable PM emission factor of 1.3 lb/kgal.
***Direct PM2.5 emission factor is filterable PM2.5 of 0.83 lb/kgal + condensable PM emission factor of 1.3 lb/kgal.
Emission (tons/yr) = Throughput (kgals/yr) x Emission Factor (lb/kgal)/ 2,000 lb/ton

Hazardous Air Pollutants (HAPs)

	HAPs - Metals				
	Arsenic	Beryllium	Cadmium	Chromium	Lead
Emission Factor in lb/mmBtu	4.00E-06	3.00E-06	3.00E-06	3.00E-06	9.00E-06
Potential Emission in tons/yr	1.39E-02	1.05E-02	1.05E-02	1.05E-02	3.14E-02

	HAPs - Metals (continued)			
	Mercury	Manganese	Nickel	Selenium
Emission Factor in lb/mmBtu	3.00E-06	6.00E-06	3.00E-06	1.50E-05
Potential Emission in tons/yr	1.05E-02	2.09E-02	1.05E-02	5.23E-02

Methodology
No data was available in AP-42 for organic HAPs
Potential Emissions (tons/year) = Throughput (mmBtu/hr) * Emission Factor (lb/mmBtu)* 8,760 hrs/yr /2,000 lb/ton

Greenhouse Gases (GHGs)

	Greenhouse Gas		
	CO2	CH4	N2O
Emission Factor in lb/kgal	21,500	0.216	0.26
Potential Emission in tons/yr	8549.29	0.09	0.10
Summed Potential Emissions in tons/yr	8549.48		
CO2e Total in tons/yr	8582.25		

Methodology
The CO2 Emission Factor for #1 Fuel Oil is 21500. The CO2 Emission Factor for #2 Fuel Oil is 22300.
Emission Factors are from AP 42, Tables 1.3-3, 1.3-8, and 1.3-12 (SCC 1-03-005-01/02/03) Supplement E 9/99 (see erata file)
Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.
Emission (tons/yr) = Throughput (kgals/yr) x Emission Factor (lb/kgal)/2,000 lb/ton
CO2e (tons/yr) = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potentital Emission Ton/yr x CH4 GWP (25) + N2O Potential Emission ton/yr x N2O GWP (298).

Appendix A: Emissions Calculations
Distillation System
PAC-2

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Emission Unit	Number of Batches (batches/day)	Uncontrolled Propylene Oxide Emissions[1] (lbs/batch)	Bubbler Efficiency (%)	Uncontrolled Propylene Oxide Emissions (ton/yr)	Controlled Propylene Oxide Emissions (ton/yr)
PAC-2	2	0.11	95%	0.04	0.002

Notes:
[1]Provided by facility based on reaction kinetics and distillation system design.

Methodology:
Uncontrolled Propylene Oxide Emissions (ton/yr) = Number of Batches (batches/day) * Uncontrolled Propylene Oxide Emissions (lbs/batch) * 365 (days/yr) * 1 (ton)/2,000 (lb)
Controlled Propylene Oxide Emissions (ton/yr) = Uncontrolled Propylene Oxide Emissions (ton/yr) * (1-Bubbler Effciency/100)

Appendix A: Emissions Calculations
Dryers - Particulate

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Particulate Emissions

Permit List No.	Unit Number	Equipment Description	Stack	Control Equipment	Gas or Air flow rate (dscfm)	Integral/ Inherent	Control Efficiency of Control Equipment	Outlet Grain Loading Limit (gr/dscf)	326 IAC 6.5	326 IAC 6.5 Limit	Other Limits	PTE After Controls (ton/yr)			PTE Before Controls (ton/yr)			Uncontrolled PTE for Part 70 (ton/yr)			Limited PTE for PSD Purposes (ton/yr)		
												PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5	PM	PM10	PM2.5
(a)	40-4	#1 Starch Flash Dryer (30 MMBtu/hr)	40-4	WS: Particulate	42,200	no	88.5%	0.02	6.5-6-25	0.020 gr/dscf, 44.1 tpy	None	31.69	31.69	31.69	275.29	275.29	275.29	275.29	275.29	275.29	44.10	44.10	44.10
(b)	40-3	#2 Starch Flash Dryer (36 MMBtu/hr)	40-3	WS: Particulate	73,000	no	94.2%	0.0200	6.5-6-25	0.020 gr/dscf, 42.3 tpy	PSD minor: Starch produced from 40-3 shall not exceed 127,000 tons per year and 0.566 lb PM/PM10 per ton of starch produced	54.81	54.81	54.81	943.42	943.42	943.42	943.42	943.42	943.42	35.94	35.94	54.81
(c)	40-2	#3 Starch Flash Dryer (36 MMBtu/hr)	40-2	WS: Particulate	60,000	no	94.8%	0.0200	6.5-6-25	0.02 gr/dscf, 31.9 tpy	None	45.05	45.05	45.05	863.05	863.05	863.05	863.05	863.05	863.05	31.90	45.05	45.05
(d)	575-1	#4 Starch Flash Dryer (43 MMBtu/hr)	575-1	WS: Particulate	84,100	no	99.5%	0.0180	6.5-6-25	0.018 gr/dscf, 32.4 tpy	None	56.83	56.83	56.83	11366.48	11366.48	11366.48	11366.48	11366.48	11366.48	32.40	56.83	56.83
(e)	575-2	#5 Starch Flash Dryer (38 MMBtu/hr)	575-2	WS: Particulate	84,200	no	99.5%	0.011	6.5-6-25	0.011 gr/dscf, 32.4 tpy	None	34.77	34.77	34.77	6954.44	6954.44	6954.44	6954.44	6954.44	6954.44	32.40	34.77	34.77
(f)	575-3	#6 Starch Flash Dryer (40 MMBtu/hr)	575-3	WS: Particulate	84,100	no	99.50%	0.012	6.5-1-2	0.03 gr/dscf	PSD Minor: PM: 0.012 gr/dscf, 7.82 lb/hr, 34.25 tpy; PM10: 0.012 gr/dscf, 6.253 lb/hr, 27.39 tpy	37.89	37.89	37.89	7577.65	7577.65	7577.65	7577.65	7577.65	7577.65	34.25	27.39	37.89
(g)	5549-1	#1 Spray Dryer (25 MMBtu/hr)	5549-1	WS: Particulate	26,000	no	99.5%	0.030	6.5-1-2	0.03 gr/dscf	PSD Minor Limit: Combined input of start for 5549-1 and 5549-2 shall not exceed 30,000 ton/yr. Emission rate shall not exceed 2.50 lb/ PM and 2.50 lb PM10 per ton of starch.	29.28	29.28	29.28	5856.69	5856.69	5856.69	5856.69	5856.69	5856.69	37.50	37.50	29.28
(h)	5549-2	#2 Spray Dryer (25 MMBtu/hr)	5549-2	WS: Particulate	26,000	no	99.5%	0.030	6.5-1-2	0.03 gr/dscf		29.28	29.28	29.28	5856.69	5856.69	5856.69	5856.69	5856.69	5856.69			29.28
(i)	5502-1A	Feed Dryer (77 MMBtu/hr)	5502-7	First Effect Wash Water System: SO2; RTO: Particulate and VOC	45,148	no	95.08%	0.0114	6.5-1-2	0.03 gr/dscf	PSD Minor Limit: PM/PM10: 0.0114 gr/dscf, 4.533 lb/hr, 19.855 tpy.	19.32	19.32	19.32	392.74	392.74	392.74	392.74	392.74	392.74	19.855	19.855	19.855
(j)	5502-1B	Germ Dryer (20 MMBtu/hr)	5502-7	RTO: Particulate and VOC		no			6.5-1-2	0.03 gr/dscf													
(k)	5502-1C	Gluten Dryer (32 MMBtu/hr)	5502-7	RTO: Particulate and VOC		no			6.5-1-2	0.03 gr/dscf													
(l)	5502-1D	RTO (18 MMBtu/hr)	5502-7	N/A		no			6.5-1-2	0.03 gr/dscf													
(m)	5549-28	Spray Agglomerator #3	5549-28	WS: Particulate	38,000.0	no	99%	0.025	6.5-1-2	0.03 gr/dscf	PSD Minor: PM/PM10: 0.025 gr/dscf, 8.143 lb/hr, 35.67 tpy	35.67	35.67	35.67	3566.57	3566.57	3566.57	3566.57	3566.57	3566.57	35.67	35.67	35.67

Controls: RTO = Regenerative Thermal Oxidizer, WS = Wet Scrubber

Methodology

PTE After Controls (ton/yr) = Gas or Air Flow Rate (dscfm) x Outlet Grain Loading Limit (gr/dscf) x (60 min/hr) x (8760 hr/yr) x (1 lb/7000 gr) x (1 ton/2000 lb)

PTE Before Controls (ton/yr) = PTE After Controls / (1 - Control Efficiency)

Uncontrolled PTE for Part 70 Purposes (ton/yr) = PTE Before Controls

Limited PTE for PSD Purposes (ton/yr):

Limited PTE is based on PSD Minor Limits, if applicable or based on 326 IAC 6.5 limits.

The unit has a specific limit for this pollutant.

The unit does not have a specific limit for this pollutant. However, a control device is required to meet a limit for PM and/or PM10, so the PTE is being shown after control.

Appendix A: Emissions Calculations
Dryers - SO2, VOC, and HAPs

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

SO2 Emissions

Permit List No.	Unit ID	Unit Description	SO2 Control	SO2 Emissions After Control (lb/hr)	Control Efficiency	SO2 PTE After Controls (ton/yr)	SO2 PTE Before Controls (ton/yr)	Limited PTE SO2 (lb/hr)	Limited PTE SO2 (ton/yr)
(i)	5502-1A	Feed Dryer	First Effect Water Wash System	5.54	60%	24.27	60.66	8.05	35.26
(j)	5502-1B	Germ Dryer							
(k)	5502-1C	Gluten Dryer							

Methodology
SO2 Emissions After Control (lb/hr) are based on the highest test result from testing conducted on 11/10/2010.
SO2 PTE After Controls (ton/yr) = SO2 Emissions After Control (lb/hr) x (8760 hr/yr) x (1 ton/2000 lb)
SO2 PTE Before Controls (ton/yr) = SO2 PTE After Controls (ton/yr) / (1 - Control Efficiency)

VOC Emissions

Permit List No.	Unit ID	Unit Description	VOC Control	VOC Emissions After Control (lb/hr)	Control Efficiency	VOC PTE After Controls (ton/yr)	VOC PTE Before Controls (ton/yr)	Limited PTE VOC (lb/hr)	Limited PTE VOC (ton/yr)
(i)	5502-1A	Feed Dryer	5502-1D: RTO	4.29	96.00%	18.79	469.76	4.89	21.42
(j)	5502-1B	Germ Dryer							
(k)	5502-1C	Gluten Dryer							

Methodology
VOC Emissions After Control (lb/hr) are based on the highest test result from testing conducted on 11/1/2012.
Control Efficiency is based on the testing conducted on 11/1/2012.
VOC PTE After Controls (ton/yr) = VOC Emissions After Control (lb/hr) x (8760 hr/yr) x (1 ton/2000 lb)
VOC PTE Before Controls (ton/yr) = VOC PTE After Controls (ton/yr) / (1 - Control Efficiency)

Combined HAPs (acetaldehyde, acrolein, methanol, formaldehyde)

Permit List No.	Unit ID	Unit Description	Combined HAP Control	Combined HAP Emissions After Control (lb/hr)	Control Efficiency	Combined HAP PTE Before Controls (ton/yr)	Combined HAP PTE After Controls (ton/yr)	Limited PTE Combined HAP (lb/hr)	Limited PTE Combined HAP (ton/yr)
(i)	5502-1A	Feed Dryer	5502-1D: RTO	1.30	95.1%	116.20	5.69	2.65	11.60
(j)	5502-1B	Germ Dryer							
(k)	5502-1C	Gluten Dryer							

Methodology
Combined HAP Emissions After Control (lb/hr) and Control Efficiency are based on test results from testing conducted on 2/23/2016.
Combined HAP PTE After Controls (ton/yr) = Combined HAP Emissions After Control (lb/hr) x (8760 hr/yr) x (1 ton/2000 lb)
Combined HAP PTE Before Controls (ton/yr) = Combined HAP PTE After Controls (ton/yr) / (1 - Control Efficiency)

Acetaldehyde Emissions

Permit List No.	Unit ID	Unit Description	Acetaldehyde Control	Acetaldehyde Emissions After Control (lb/hr)	Control Efficiency	Acetaldehyde PTE Before Controls (ton/yr)	Acetaldehyde PTE After Controls (ton/yr)	Limited PTE Acetaldehyde (lb/hr)	Limited PTE Acetaldehyde (ton/yr)
(i)	5502-1A	Feed Dryer	5502-1D: RTO	1.05	95.7%	107.53	4.60	2.24	9.80
(j)	5502-1B	Germ Dryer							
(k)	5502-1C	Gluten Dryer							

Methodology
Acetaldehyde Emissions After Control (lb/hr) and Control Efficiency are based on test results from testing conducted on 2/23/2016.
Acetaldehyde PTE After Controls (ton/yr) = Acetaldehyde Emissions After Control (lb/hr) x (8760 hr/yr) x (1 ton/2000 lb)
Acetaldehyde PTE Before Controls (ton/yr) = Acetaldehyde PTE After Controls (ton/yr) / (1 - Control Efficiency)

Appendix A: Emissions Calculations
Natural Gas Combustion (< 100 MMBtu/hr)

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

			Criteria Pollutants						
			PM*	PM10*	PM2.5*	SO2	NOx**	VOC	CO
Emission Factor in lb/MMCF			1.9	7.6	7.6	0.6	100.0	5.5	84.0
NOx Limit for 5502-1A through 1D in lb/MMCF							62.0		
Emission Unit	Heat Input Capacity (MMBtu/hr)	Potential Throughput (MMCF/yr)	Potential Emissions (tons/yr)						
40-4: #1 Starch Flash Dryer	30	257.647	0.245	0.979	0.979	0.077	12.882	0.709	10.821
40-3: #2 Starch Flash Dryer	36	309.176	0.294	1.175	1.175	0.093	15.459	0.850	12.985
40-2: #3 Starch Flash Dryer	36	309.176	0.294	1.175	1.175	0.093	15.459	0.850	12.985
575-1: #4 Starch Flash Dryer	43	369.294	0.351	1.403	1.403	0.111	18.465	1.016	15.510
575-2: #5 Starch Flash Dryer	38	326.353	0.310	1.240	1.240	0.098	16.318	0.897	13.707
575-3: #6 Starch Flash Dryer	40	343.529	0.326	1.305	1.305	0.103	17.176	0.945	14.428
5549-1: #1 Spray Dryer	25	214.706	0.204	0.816	0.816	0.064	10.735	0.590	9.018
5549-2: #2 Spray Dryer	25	214.706	0.204	0.816	0.816	0.064	10.735	0.590	9.018
5502-1A: Feed Dryer	77	661.294	0.628	2.513	2.513	0.198	33.065	1.819	27.774
5502-1B: Germ Dryer	20	171.765	0.163	0.653	0.653	0.052	8.588	0.472	7.214
5502-1C: Gluten Dryer	32	274.824	0.261	1.044	1.044	0.082	13.741	0.756	11.543
5502-1D: RTO	18	154.588	0.147	0.587	0.587	0.046	7.729	0.425	6.493
5549-28: Spray Agglomerator #3	25	214.706	0.204	0.816	0.816	0.064	10.735	0.590	9.018
5549-13: Agglomerator	1.824	15.665	0.015	0.060	0.060	0.005	0.783	0.043	0.658
YX31914A: Process Heater	5.1	43.800	0.042	0.166	0.166	0.013	2.190	0.120	1.840
FH31924: FBR2 Burner	3	25.765	0.024	0.098	0.098	0.008	1.288	0.071	1.082
EF31929A: Air Heater 1	0.4	3.435	0.003	0.013	0.013	0.001	0.172	0.009	0.144
EF31927A: Air Heater 2	0.4	3.435	0.003	0.013	0.013	0.001	0.172	0.009	0.144
Drover CWS Air Heaters	4.5	38.647	0.037	0.147	0.147	0.012	1.932	0.106	1.623
FH31934 FBR3 Burner	3	25.765	0.024	0.098	0.098	0.008	1.288	0.071	1.082
EF31936A FBR3 Dehumidifier Air Heater 1	0.4	3.435	0.003	0.013	0.013	0.001	0.172	0.009	0.144
EF31937A FBR3 Dehumidifer Air Heater 2	0.4	3.435	0.003	0.013	0.013	0.001	0.172	0.009	0.144
Total			**3.79**	**15.14**	**15.14**	**1.20**	**199.26**	**10.96**	**167.38**
Fuel Limit for 5502-1A-D		1263.000					39.15		

Emission Factors are from AP-42, Tables 1.4-1 and 1.4-2.
*PM emission factor is filterable PM only. PM10 emission factor is filterable PM10 and condensable PM combined. PM2.5 emission factor is filterable PM2.5 and condensable PM combined.
**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recirculation = 32. The NOx emission factor for units 5502-1A through 5502-1D is based on the NOx emission limit for these units. This limit is achievable based on past testing.

Appendix A: Emissions Calculations
Natural Gas Combustion (< 100 MMBtu/hr)

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

			HAPs - Organics						HAPs - Metals					Total HAPs
			Benzene	Dichlorobenzene	Formaldehyde	Hexane	Toluene	Total PAH HAPs	Lead	Cadmium	Chromium	Manganese	Nickel	
Emission Factor in lb/MMCF			2.1E-03	1.2E-03	7.5E-02	1.8E+00	3.4E-03	1.1E-05	5.0E-04	1.1E-03	1.4E-03	3.8E-04	2.1E-03	1.8880
Emission Unit	Heat Input Capacity (MMBtu/hr)	Potential Throughput (MMCF/yr)	Potential Emissions (tons/yr)											
40-4: #1 Starch Flash Dryer	30	257.647	2.7E-04	1.5E-04	9.7E-03	2.3E-01	4.4E-04	1.5E-06	6.4E-05	1.4E-04	1.8E-04	4.9E-05	2.7E-04	2.4E-01
40-3: #2 Starch Flash Dryer	36	309.176	3.2E-04	1.9E-04	1.2E-02	2.8E-01	5.3E-04	1.8E-06	7.7E-05	1.7E-04	2.2E-04	5.9E-05	3.2E-04	2.9E-01
40-2: #3 Starch Flash Dryer	36	309.176	3.2E-04	1.9E-04	1.2E-02	2.8E-01	5.3E-04	1.8E-06	7.7E-05	1.7E-04	2.2E-04	5.9E-05	3.2E-04	2.9E-01
575-1: #4 Starch Flash Dryer	43	369.294	3.9E-04	2.2E-04	1.4E-02	3.3E-01	6.3E-04	2.1E-06	9.2E-05	2.0E-04	2.6E-04	7.0E-05	3.9E-04	3.5E-01
575-2: #5 Starch Flash Dryer	38	326.353	3.4E-04	2.0E-04	1.2E-02	2.9E-01	5.5E-04	1.9E-06	8.2E-05	1.8E-04	2.3E-04	6.2E-05	3.4E-04	3.1E-01
575-3: #6 Starch Flash Dryer	40	343.529	3.6E-04	2.1E-04	1.3E-02	3.1E-01	5.8E-04	2.0E-06	8.6E-05	1.9E-04	2.4E-04	6.5E-05	3.6E-04	3.2E-01
5549-1: #1 Spray Dryer	25	214.706	2.3E-04	1.3E-04	8.1E-03	1.9E-01	3.7E-04	1.2E-06	5.4E-05	1.2E-04	1.5E-04	4.1E-05	2.3E-04	2.0E-01
5549-2: #2 Spray Dryer	25	214.706	2.3E-04	1.3E-04	8.1E-03	1.9E-01	3.7E-04	1.2E-06	5.4E-05	1.2E-04	1.5E-04	4.1E-05	2.3E-04	2.0E-01
5502-1A: Feed Dryer	77	661.294	6.9E-04	4.0E-04	2.5E-02	6.0E-01	1.1E-03	3.8E-06	1.7E-04	3.6E-04	4.6E-04	1.3E-04	6.9E-04	6.2E-01
5502-1B: Germ Dryer	20	171.765	1.8E-04	1.0E-04	6.4E-03	1.5E-01	2.9E-04	9.8E-07	4.3E-05	9.4E-05	1.2E-04	3.3E-05	1.8E-04	1.6E-01
5502-1C: Gluten Dryer	32	274.824	2.9E-04	1.6E-04	1.0E-02	2.5E-01	4.7E-04	1.6E-06	6.9E-05	1.5E-04	1.9E-04	5.2E-05	2.9E-04	2.6E-01
5502-1D: RTO	18	154.588	1.6E-04	9.3E-05	5.8E-03	1.4E-01	2.6E-04	8.8E-07	3.9E-05	8.5E-05	1.1E-04	2.9E-05	1.6E-04	1.5E-01
5549-28: Spray Agglomerator #3	25	214.706	2.3E-04	1.3E-04	8.1E-03	1.9E-01	3.7E-04	1.2E-06	5.4E-05	1.2E-04	1.5E-04	4.1E-05	2.3E-04	2.0E-01
5549-13: Agglomerator	1.824	15.665	1.6E-05	9.4E-06	5.9E-04	1.4E-02	2.7E-05	8.9E-08	3.9E-06	8.6E-06	1.1E-05	3.0E-06	1.6E-05	1.5E-02
YX31914A: Process Heater	5.1	43.800	4.6E-05	2.6E-05	1.6E-03	3.9E-02	7.4E-05	2.5E-07	1.1E-05	2.4E-05	3.1E-05	8.3E-06	4.6E-05	4.1E-02
FH31924: FBR2 Burner	3	25.765	2.7E-05	1.5E-05	9.7E-04	2.3E-02	4.4E-05	1.5E-07	6.4E-06	1.4E-05	1.8E-05	4.9E-06	2.7E-05	2.4E-02
EF31929A: Air Heater 1	0.4	3.435	3.6E-06	2.1E-06	1.3E-04	3.1E-03	5.8E-06	2.0E-08	8.6E-07	1.9E-06	2.4E-06	6.5E-07	3.6E-06	3.2E-03
EF31927A: Air Heater 2	0.4	3.435	3.6E-06	2.1E-06	1.3E-04	3.1E-03	5.8E-06	2.0E-08	8.6E-07	1.9E-06	2.4E-06	6.5E-07	3.6E-06	3.2E-03
Drover CWS Air Heaters	4.5	38.647	4.1E-05	2.3E-05	1.4E-03	3.5E-02	6.6E-05	2.2E-07	9.7E-06	2.1E-05	2.7E-05	7.3E-06	4.1E-05	3.6E-02
FH31934 FBR3 Burner	3	25.765	2.7E-05	1.5E-05	9.7E-04	2.3E-02	4.4E-05	1.5E-07	6.4E-06	1.4E-05	1.8E-05	4.9E-06	2.7E-05	2.4E-02
EF31936A FBR3 Dehumidifier Air Heater 1	0.4	3.435	3.6E-06	2.1E-06	1.3E-04	3.1E-03	5.8E-06	2.0E-08	8.6E-07	1.9E-06	2.4E-06	6.5E-07	3.6E-06	3.2E-03
EF31937A FBR3 Dehumidifer Air Heater 2	0.4	3.435	3.6E-06	2.1E-06	1.3E-04	3.1E-03	5.8E-06	2.0E-08	8.6E-07	1.9E-06	2.4E-06	6.5E-07	3.6E-06	3.2E-03
Total			**4.2E-03**	**2.4E-03**	**1.5E-01**	**3.6E+00**	**6.8E-03**	**2.3E-05**	**1.0E-03**	**2.2E-03**	**2.8E-03**	**7.6E-04**	**4.2E-03**	**3.8E+00**

Emission Factors are from AP-42, Tables 1.4-3 and 1.4-4.
The five highest organic and metal HAPs emission factors are provided above plus total PAH HAPs. The total HAPs is the sum of all HAPs listed in AP-42, Tables 1.4-3 and 1.4-4.
Additional HAPs emission factors are available in AP-42, Chapter 1.4.

Methodology
Heating Value of Natural Gas is assumed to be 1020 MMBtu/MMCF
Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) * 8,760 hrs/yr * 1 MMCF/1,020 MMBtu
Potential Emission (tons/yr) = Throughput (MMCF/yr) * Emission Factor (lb/MMCF) * (1 ton/2,000 lb)

Appendix A: Emission Calculations
Reciprocating Internal Combustion Engines - Diesel Fuel (≤ 600 HP)

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Unit	FP1	FP2	FP3
Output Horsepower Rating (hp)	210.0	300.0	300.0
Maximum Hours Operated per Year	500	500	500
Potential Throughput (hp-hr/yr)	105,000	150,000	150,000

	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
Unit	Potential Emissions (ton/yr)						
FP1: Emergency Fire Pump	0.12	0.12	0.12	0.11	1.63	0.13	0.35
FP2: Emergency Fire Pump	0.17	0.17	0.17	0.15	2.33	0.19	0.50
FP3: Emergency Fire Pump	0.17	0.17	0.17	0.15	2.33	0.19	0.50
Total	**0.45**	**0.45**	**0.45**	**0.42**	**6.28**	**0.51**	**1.35**

*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
Unit	Potential Emissions (ton/yr)							
FP1: Emergency Fire Pump	3.43E-04	1.50E-04	1.05E-04	1.44E-05	4.34E-04	2.82E-04	3.40E-05	6.17E-05
FP2: Emergency Fire Pump	4.90E-04	2.15E-04	1.50E-04	2.05E-05	6.20E-04	4.03E-04	4.86E-05	8.82E-05
FP3: Emergency Fire Pump	4.90E-04	2.15E-04	1.50E-04	2.05E-05	6.20E-04	4.03E-04	4.86E-05	8.82E-05
Total	**1.32E-03**	**5.80E-04**	**4.04E-04**	**5.54E-05**	**1.67E-03**	**1.09E-03**	**1.31E-04**	**2.38E-04**

***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)	**5.49E-03**

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]

Appendix A: Emission Calculations
Bulk Chemical Storage Tanks

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Bulk Chemical Storage Tanks

Unit ID	Emission Unit Description	Worst-Case Tank Volume (gal)	Worst-Cast Annual Throughput (gal/yr)	Worst-Case Daily Throughput (gal/day)	Antoine's Coefficient A	Antoine's Coefficient B	Antoine's Coefficient C	Potential VOC Emissions (lb/yr)	Potential VOC Emissions (tpy)	Potential VOC Emissions (lb/day)	Potential VOC Emissions (lb/hr)
T1	Acetic Anhydride Storage Tanks (3)	16000	566240	5400	7.15	1445	199.82	72.92	0.03646	0.91	0.86
T2	Hydrochloric Acid Storage Tanks (4)	16000	414996	5100	9.56	2315	269.72	205.11	0.102555	3.04	

Methodology
Potential Emissions Quantified using a TANKS 4.0.9.d - equivalent tool for calculating working and standing losses from storage tanks.

Worst-Case Annual Throughput (gal/yr) for each type of bulk chemical storage tank based on the highest annual throughput for all tanks of that type for 2012-2013, multiplied by a safety factor of 1.5.
Antoine's Coefficients for acetic anhydride obtained from TANKS 4.0.9.d.
Antoine's Coefficients for hydrochloric acid derived from regression analysis of vapor pressure data interpolated from Perry's Chemical Engineers' Handbook, 7th Edition, Table 2-10, Partial Pressure of HCl over Aqueous Solutions of HCl (32 and 34% HCl).
Potential VOC Emissions (lb/day) are calculated during the worst-case month (July) assuming 1 shipment in 1 day, plus standing losses for 1 day.
Potential VOC emissions (lb/hr) are calculated during the worst-case month (July) assuming 1 shipment in 1 hour.

Appendix A: Emission Calculations
Degreasers

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Unit ID	Emission Unit Description	Maximum Annual Solvent Usage (gal/yr)	Solvent Density (lb/gal)	VOC Content (%)	VOC Emissions (tpy)	VOC Emissions (lb/hr)	VOC Emissions (lb/day)
D1	Degreaser #1	465	6.7	100%	1.56	0.50	11.98
D2	Degreaser #2	465	6.7	100%	1.56	0.50	11.98
D3	Degreaser #3	465	6.7	100%	1.56	0.50	11.98

Methodology
Potential VOC emissions are conservatively calculated assuming 100% VOC in solvent used is emitted.
Solvent density and VOC content per manufacturer MSDS. Solvent contains no HAP.
Hourly and daily emissions are conservatively calculated assuming 5 days of operation per week, equivalent to 6,240 hr/yr and 260 day/yr.
VOC Emissions (tpy) = Maximum Annual Solvent Usage (gal/yr) x Solvent Density (lb/gal) x VOC Content (%) x (1 ton/2000 lb)
VOC Emissions (lb/hr) = VOC Emissions (tpy) x (2000 lb/1 ton) x (1 yr/6240 hr)
VOC Emissions (lb/day) = VOC Emissions (tpy) x (2000 lb/1 ton) x (1 yr/260 day)

Appendix A: Emission Calculations
Sandblaster

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Unit ID	Emission Unit Description	Maximum Exhaust Flow Rate (cfm)	Maximum Exhaust Particulate Concentration (gr/dscf)	Controlled PTE PM/PM10/PM2.5		Control Efficiency	Uncontrolled PTE PM/PM10/PM2.5	
				(lb/hr)	(ton/yr)		(lb/hr)	(ton/yr)
S1	Sandblaster	90	0.03	0.02	0.10	99%	2.31	10.14

Methodology
Maximum exhaust flowrate per manufacturer specifications.
Maximum exhaust particulate concentration conservatively assumed to be 0.03 gr/dscf.
Controlled PTE (lb/hr) = Maximum Exhaust Flow Rate (cfm) x Maximum Exhaust Particulate Concentration (gr/dscf) x (60 min/hr) x (1 lb/7000 gr)
Uncontrolled PTE (lb/hr) = Controlled PTE (lb/hr) / (1 - Control Efficiency)
PTE (ton/yr) = PTE (lb/hr) x (8760 hr/yr) x (1 ton/2000 lb)

Appendix A: Emissions Summary
Gasoline Fuel Transfer and Dispensing Operation

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

To calculate evaporative emissions from the gasoline dispensing fuel transfer and dispensing operation emission factors from AP-42 Chapter 5.2 Transportation And Marketing Of Petroleum Liquids were used. The total potential emission of VOC is as follows:

Gasoline Throughput =	333.3	gallons/day
Gasoline Throughput =	121.65	kgal/yr

Volatile Organic Compounds (VOC)

Emission Source	Emission Factor (lb/kgal of throughput)*	PTE of VOC (tons/yr)
Filling storage tank (splash filling)	11.50	0.6995
Tank breathing and emptying	1.00	0.0608
Vehicle refueling (displaced losses - uncontrolled)	11.00	0.6691
Spillage	0.70	0.0426
	Total	**1.47**

Methodology
The gasoline throughput is based on the worst case assumption of 9,999 gallons per month (less than 10,000 gallons per month).
*Emission Factors from AP-42 Chapter 5.2 Transportation And Marketing Of Petroleum Liquids (dated 6/08), Table 5.2-7. Worst case emission factors used.
Gasoline Throughput (kgal/yr) = [Gasoline Throughput (gallons/day)] * [365 days/yr] * [kgal/1000 gal]
PTE of VOC (tons/yr) = [Gasoline Throughput (kgal/yr)] * [Emission Factor (lb/kgal)] * [ton/2000 lb]

Hazardous Air Pollutants (HAPs)

Volatile Organic HAP	CAS#	Hazardous Air Pollutant (HAP) Content (vapor mass fraction)**	PTE of HAP (tons/yr)	
Benzene	71-43-2	0.37%	5.4E-03	
n-Hexane	110-54-3	0.34%	5.0E-03	
Toluene	108-88-3	0.40%	5.9E-03	
m-Xylenes	108-38-3	0.11%	1.6E-03	
		Total PTE of HAPs (tons/yr)	**1.8E-02**	
		PTE of Worst Single HAP (tons/yr)	**5.9E-03**	**(Toluene)**

Methodology
**Source: US EPA TANKS Version 4.09 program
PTE of Total HAPs (tons/yr) = [Total HAP Content (% by weight)] * [PTE of VOC (tons/yr)]
PTE of HAP (tons/yr) = [Hazardous Air Pollutant (HAP) Content (vapor mass fraction)] * [PTE of VOC (tons/yr)]

Appendix A: Emission Calculations
Batch Reactors

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Unit	Number of Reactors	Potential PPO Emissions Per Unit (ton/yr)	Total PTE VOC/HAP (ton/yr)
Batch Reactors: 190, 191, 192, 193, 200, 201, 203, 211, 212, 213	10	0.904	9.04

Methodology
PPO = Propylene Oxide, which is a VOC and HAP
The Potential PPO Emissions Per Unit (ton/yr) are based on the worst case formulation and scenario for the batch reactors.
Total PTE VOC/HAP (ton/yr) = Number of Reactors x Potential PPO Emissions Per Unit (ton/yr)

Appendix A: Emissions Calculations
Millshouse Draft Fans

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Trivial if SO2	Insignificant if SO2	SEL SO_2	25	tpy	64 lb/lbmol SO_2	$Q_{std} = Q_a(T_{std}/T_a)(P_a/P_{std})$
< 1 lb/day	< 5 lb/hr or		10	lb/hr	385.4 ft^3/lbmol Air	std = variable at standard temp & press
	< 25 lb/day					a = actual conditions
		SER SO_2	40	tpy		T_{std} = 70°F
						P_{std} = 29.92 inHg or 1 atm or 14.7psi
						$Q_{dscfm} = Q_{scfm}$(1-%moisture)

Current Conditions

Fiber Wash Vent Fan
T_a = 92 °F
P_a = 14.7 psi
%M = 89.0%

SO_2 ppm	acfm	scfm	dscfm	lb/ft^3 SO_2	lb/hr SO_2	lb/day SO_2	tpy SO_2
30	2200	2112	232	0.000005	0.1	1.7	0.3

Fiber Box Vent Fan
T_a = 118 °F
P_a = 14.7 psi
%M = 94.0%

SO_2 ppm	acfm	scfm	dscfm	lb/ft^3 SO_2	lb/hr SO_2	lb/day SO_2	tpy SO_2
130	5000	4585	275	0.000022	0.4	8.6	1.6

Grind Tank Vent Fan
T_a = 96 °F
P_a = 14.7 psi
%M = 93.0%

SO_2 ppm	acfm	scfm	dscfm	lb/ft^3 SO_2	lb/hr SO_2	lb/day SO_2	tpy SO_2
60	4200	4004	280	0.000010	0.2	4.0	0.7

Process Tanks Fan
T_a = 96 °F
P_a = 14.7 psi
%M = 73.0%

SO_2 ppm	acfm	scfm	dscfm	lb/ft^3 SO_2	lb/hr SO_2	lb/day SO_2	tpy SO_2
15	2200	2097	566	0.000002	0.1	2.0	0.4

MST O/F Fan
T_a = 95 °F
P_a = 14.7 psi
%M = 89.0%

SO_2 ppm	acfm	scfm	dscfm	lb/ft^3 SO_2	lb/hr SO_2	lb/day SO_2	tpy SO_2
140	1300	1241	137	0.000023	0.2	4.6	0.8

1st Pass Fiber Wash Tank Vent
T_a = 118 °F
P_a = 14.7 psi
%M = 94.0%

SO_2 ppm	acfm	scfm	dscfm	lb/ft^3 SO_2	lb/hr SO_2	lb/day SO_2	tpy SO_2
130	6543	6000	360	0.000022	0.5	11.2	2.0

Total SO_2 Emissions (tpy) 5.8

Methodology:
SCFM = ACFM * ((460+70)/(460+Ta ºF))
DSCFM = ACFM * (1-%M)
lb/ft3 SO2 = SO2 ppm / 1,000,000 * lb/lbmol SO2/ft3/lbmol Air
lb/hr SO2 = dscfm * lb/ft3SO2 * 60 min
lb/day SO2 = lb/hr SO2 * 24hr/day
tpy SO2 = lb/hr SO2 * 8760 hours/2000lbs

Proposed Conditions

Fiber Wash Vent Fan
T_a = 92 °F
P_a = 14.7 psi
%M = 89.0%

SO_2 ppm	acfm	scfm	dscfm	lb/ft^3 SO_2	lb/hr SO_2	lb/day SO_2	tpy SO_2	tpy Change
30	2200	2112	232	0.000005	0.1	1.7	0.3	0.0

Fiber Box Vent Fan
T_a = 118 °F
P_a = 14.7 psi
%M = 94.0%

SO_2 ppm	acfm	scfm	dscfm	lb/ft^3 SO_2	lb/hr SO_2	lb/day SO_2	tpy SO_2	tpy Change
130	5000	4585	275	0.000022	0.4	8.6	1.6	0.0

Grind Tank Vent Fan
T_a = 96 °F
P_a = 14.7 psi
%M = 93.0%

SO_2 ppm	acfm	scfm	dscfm	lb/ft^3 SO_2	lb/hr SO_2	lb/day SO_2	tpy SO_2	tpy Change
60	4200	4004	280	0.000010	0.2	4.0	0.7	0.0

Process Tanks Fan
T_a = 96 °F
P_a = 14.7 psi
%M = 73.0%

SO_2 ppm	acfm	scfm	dscfm	lb/ft^3 SO_2	lb/hr SO_2	lb/day SO_2	tpy SO_2	tpy Change
15	2200	2097	566	0.000002	0.1	2.0	0.4	0.0

MST O/F Fan
T_a = 95 °F
P_a = 14.7 psi
%M = 89.0%

SO_2 ppm	acfm	scfm	dscfm	lb/ft^3 SO_2	lb/hr SO_2	lb/day SO_2	tpy SO_2	tpy Change
140	1300	1241	137	0.000023	0.2	4.6	0.8	0.0

1st Pass Fiber Wash Tank Vent
T_a = 118 °F
P_a = 14.7 psi
%M = 94.0%

SO_2 ppm	acfm	scfm	dscfm	lb/ft^3 SO_2	lb/hr SO_2	lb/day SO_2	tpy SO_2	tpy Change
130	6543	6000	360	0.000022	0.5	11.2	2.0	0.0

2nd Fiber Box Vent Fan
T_a = 118 °F
P_a = 14.7 psi
%M = 94.0%

SO_2 ppm	acfm	scfm	dscfm	lb/ft^3 SO_2	lb/hr SO_2	lb/day SO_2	tpy SO_2	tpy Change
130	6543	6000	360	0.000022	0.5	11.2	2.0	2.0

Total SO_2 Emissions (tpy) 7.89

Total Change in SO_2 emissions (tpy) 2.04

Methodology:
SCFM = ACFM * ((460+70)/(460+Ta ºF))
DSCFM = ACFM * (1-%M)
lb/ft3 SO2 = SO2 ppm / 1,000,000 * lb/lbmol SO2/ft3/lbmol Air
lb/hr SO2 = dscfm * lb/ft3SO2 * 60 min
lb/day SO2 = lb/hr SO2 * 24hr/day
tpy SO2 = lb/hr SO2 * 8760 hours/2000lbs

Appendix A: Emissions Calculations
Steep Tanks

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

Background Information
Large Corn Steeps

Highest Steep SO_2 Measurement =	190	ppm
Number of steeps	19	steeps
Max number of steeps filled per day	13	steeps/day
Number of hours per steep	1.85	hr/steep
Capacity per tank	5400	bu/tank

SO_2 ppm [1]	lb/cuft SO_2	Fill time (hr/steep)	Bu/year	Tanks filled/yr	Tank size (cuft)	Steeping Emissions		Steeping Emissions	
						SO_2 emission Filling Rate (lb/hr)	lb/day/steep	Annual SO_2 Emissions (lb SO_2/year)	Annual SO_2 Emissions (ton/yr)
200	3.57E-05	1.85	25,550,000	4731	8892	0.17	4.11	1500	0.75

[1] Highest concentration of SO_2 from the steeps in 190 ppm, assuming 200 ppm to be conservative. Each steep is a trivial emission unit (< 1 lb/day SO_2)

Methodology:
lb/cuft SO2 = SO2 ppm / 1,000,000 / 359 * 64
Fill time (hr) = Number of hours per steep hr/steep
Bu/year = 70,000 bushel/day * 365 days/1year
Tanks filled/yr = Bu/year / Capacity per tank (bu/tank)
Tank size (cuft) = 5700 * 1.56
SO2 emission Filling rate (lb/hr) = lb/cuft SO2 * Tanks Size (cuft) / Fill time (hr)
lb/day/steep = SO2 emission filling rate (lb/hr) * fill time (hr) * Max number of steeps filled per day (steeps/day)
Annual SO2 Emissions (lb SO2/year) = Tanks filled/yr * Tank size (cuft) * lb/cuft SO2
Annual SO2 Emissions (ton/yr) = Annual SO2 Emissions (lb SO2/year) / 2000 lbs

Small Corn Steeps

Highest Steep SO_2 Measurement =	190	ppm
Number of steeps	2	steeps
Max number of fills per steep per day	3	fills/day
Number of hours per steep	1.00	hr/steep
Capacity per tank	500	bu/tank

SO_2 ppm [1]	lb/cuft SO_2	Fill time (hr/steep)	Bu/year	Tanks filled/yr	Tank size (cuft)	Steeping Emissions		Steeping Emissions	
						SO_2 emission Filling Rate (lb/hr)	lb/day/steep	Annual SO_2 Emissions (lb SO_2/year)	Annual SO_2 Emissions (TPY)
200	3.57E-05	1.00	1,095,000	2190	622	0.02	0.07	49	0.02

[1] Highest concentration of SO_2 from the steeps in 190 ppm, assuming 200 ppm to be conservative. Each steep is a trivial emission unit (< 1 lb/day SO_2)

Methodology:
lb/cuft SO2 = SO2 ppm / 1,000,000 / 359 * 64
Fill time (hr) = Number of hours per steep hr/steep
Bu/year = Capacity per tank (bu/tank) * Max number of fills per steep per day (fills/day) * Number of steeps * 365 days/1year
Tanks filled/yr = Bu/year / Capacity per tank (bu/tank)
Tank size (cuft) = 5700 * 1.56
SO2 emission Filling rate (lb/hr) = lb/cuft SO2 * Tanks Size (cuft) / Fill time (hr)
lb/day/steep = SO2 emission filling rate (lb/hr) * fill time (hr) * Max number of steeps filled per day (steeps/day)
Annual SO2 Emissions (lb SO2/year) = Tanks filled/yr * Tank size (cuft) * lb/cuft SO2
Annual SO2 Emissions (ton/yr) = Annual SO2 Emissions (lb SO2/year) / 2000 lbs

Appendix A: Emission Calculations
Fugitive Dust Emissions - Paved Roads

Company Name: Ingredion Incorporated Indianapolis Plant
Source Address: 1515 South Drover Street, Indianapolis, IN 46221
Permit Number: 097-43933-00042
Reviewer: Taylor Wade

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)
Corn Truck (entering plant) (one-way trip)	70.0	1.0	70.0	40.0	2800.0	1260	0.239	16.7	6097.2
Corn Truck (leaving plant) (one-way trip)	70.0	1.0	70.0	15.0	1050.0	35	0.007	0.5	169.4
Feed/Germ Truck (entering plant) (one-way trip)	20.0	1.0	20.0	15.0	300.0	980	0.186	3.7	1354.9
Feed/Germ (leaving plant) (one-way trip)	20.0	1.0	20.0	40.0	800.0	980	0.186	3.7	1354.9
Chemical Truck Rte 1 (entering plant) (one-way trip)	2.0	1.0	2.0	21.0	42.0	1435	0.272	0.5	198.4
Chemical Truck Rte 1 (leaving plant) (one-way trip)	2.0	1.0	2.0	18.0	36.0	315	0.060	0.1	43.6
Chemical Truck Rte 2 (entering plant) (one-way trip)	1.0	1.0	1.0	21.0	21.0	2600	0.492	0.5	179.7
Chemical Truck Rte 2 (leaving plant) (one-way trip)	1.0	1.0	1.0	18.0	18.0	2600	0.492	0.5	179.7
Starch Truck Rte 1 (entering plant) (one-way trip)	20.0	1.0	20.0	17.5	350.0	140	0.027	0.5	193.6
Starch Truck Rte 1 (leaving plant) (one-way trip)	20.0	1.0	20.0	38.7	774.0	140	0.027	0.5	193.6
Starch Truck Rte 2 (entering plant) (one-way trip)	17.0	1.0	17.0	17.5	297.5	420	0.080	1.4	493.6
Starch Truck Rte 2 (leaving plant) (one-way trip)	17.0	1.0	17.0	38.7	657.9	420	0.080	1.4	493.6
Starch Truck Rte 3 (entering plant) (one-way trip)	5.0	1.0	5.0	17.5	87.5	1410	0.267	1.3	487.4
Starch Truck Rte 3 (leaving plant) (one-way trip)	5.0	1.0	5.0	38.7	193.5	1410	0.267	1.3	487.4
Liquid Starch Truck (entering plant) (one-way trip)	3.0	1.0	3.0	35.0	105.0	1155	0.219	0.7	239.5
Liquid Starch Truck (leaving plant) (one-way trip)	3.0	1.0	3.0	15.0	45.0	1400	0.265	0.8	290.3
Waste (entering plant) (one-way trip)	2.0	1.0	2.0	15.0	30.0	4100	0.777	1.6	566.9
Waste (leaving plant) (one-way trip)	2.0	1.0	2.0	23.0	46.0	4100	0.777	1.6	566.9
		Totals	**280.0**		**7653.4**			**37.2**	**13590.4**

Average Vehicle Weight Per Trip = 27.3 tons/trip
Average Miles Per Trip = 0.13 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 =	27.3	27.3	27.3	tons = average vehicle weight (provided by source)
sL =	1.1	1.1	1.1	g/m^2 = silt loading value for paved roads at corn wet milling 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 =	0.350	0.070	0.0172	lb/mile
Mitigated Emission Factor, Eext =	0.320	0.064	0.0157	lb/mile

Process	Mitigated PTE of PM (tons/yr)	Mitigated PTE of PM10 (tons/yr)	Mitigated PTE of PM2.5 (tons/yr)
Vehicles (entering plant) (one-way trip)	1.57	0.31	0.08
Vehicles (leaving plant) (one-way trip)	0.61	0.12	0.03
Totals	**2.18**	**0.44**	**0.11**

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)]
Mitigated PTE (tons/yr) = [Maximum one-way miles (miles/yr)] * [Mitigated Emission Factor (lb/mile)] * (ton/2000 lbs)

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We Protect Hoosiers and Our Environment.
100 N. Senate Avenue • Indianapolis, IN 46204
(800) 451-6027 • (317) 232-8603 • www.idem.IN.gov

Eric J. Holcomb
Governor

Bruno L. Pigott
Commissioner

SENT VIA U.S. MAIL: CONFIRMED DELIVERY AND SIGNATURE REQUESTED

TO: Melissa Putnam
Ingredion Incorporated Indianapolis Plant
1515 S Drover St
Indianapolis IN 46221

DATE: July 28, 2021

FROM: Jenny Acker, Branch Chief
Permits Branch
Office of Air Quality

SUBJECT: Final Decision
Title V Significant Source Mod. (Minor PSD/EO) (120)
097-43933-00042

This notice is to inform you that a final decision has been issued for the air permit application referenced above.

Our records indicate that you are the contact person for this application. However, if you are not the appropriate person within your company to receive this document, please forward it to the correct person. In addition, the Notice of Decision has been sent to the OAQ Permits Branch Interested Parties List and, if applicable, the Consultant/Agent and/or Responsible Official/Authorized Individual.

The final decision and supporting materials are available electronically; the original signature page is enclosed for your convenience. The final decision and supporting materials available electronically at:

IDEM's online searchable database: http://www.in.gov/apps/idem/caats/ . Choose Search Option **by Permit Number**, then enter permit 43933

and

IDEM's Virtual File Cabinet (VFC): https://www.in.gov/idem. Enter VFC in the search box, then search for permit documents using a variety of criteria, such as Program area, date range, permit #, Agency Interest Number, or Source ID.

If you have technical questions regarding the enclosed documents, please contact the Office of Air Quality, Permits Branch at (317) 233-0178, or toll-free at 1-800-451-6027 (ext. 3-0178), and ask to speak to the permit reviewer who prepared the permit. If you think you have received this document in error, or have difficulty accessing the documents online, please contact Joanne Smiddie-Brush of my staff at 1-800-451-6027 (ext 3-0185), or via e-mail at jbrush@idem.IN.gov.

Final Applicant Cover Letter 8/20/20-acces via website

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

We Protect Hoosiers and Our Environment.

100 N. Senate Avenue • Indianapolis, IN 46204

(800) 451-6027 • (317) 232-8603 • www.idem.IN.gov

Eric J. Holcomb
Governor

Bruno L. Pigott
Commissioner

July 28, 2021

TO: Indianapolis Public Library - West Branch 1216 South Kappes St Indianapolis IN 46221

From: Jenny Acker, Branch Chief
Permits Branch
Office of Air Quality

Subject: **Important Information for Display Regarding a Final Determination**

Applicant Name: Ingredion Incorporated Indianapolis Plant
Permit Number: 097-43933-00042

You previously received information to make available to the public during the public comment period of a draft permit. Enclosed is a copy of the final decision and supporting materials for the same project. Please place the enclosed information along with the information you previously received. To ensure that your patrons have ample opportunity to review the enclosed permit, **we ask that you retain this document for at least 60 days.**

The applicant is responsible for placing a copy of the application in your library. If the permit application is not on file, or if you have any questions concerning this public review process, please contact Joanne Smiddie-Brush, OAQ Permits Administration Section at 1-800-451-6027, extension 3-0185.

Enclosures
Final Library 1/9/2017

Mail Code 61-53

IDEM Staff	LPOGOST 7/28/2021 Ingredion Incorporated Indianapolis Plant 097-43933-00042 /final)			AFFIX STAMP HERE IF USED AS CERTIFICATE OF MAILING
Name and address of Sender		Indiana Department of Environmental Management Office of Air Quality – Permits Branch 100 N. Senate Indianapolis, IN 46204	Type of Mail: **CERTIFICATE OF MAILING ONLY**	

Line	Article Number	Name, Address, Street and Post Office Address	Postage	Handing Charges	Act. Value (If Registered)	Insured Value	Due Send if COD	R.R. Fee	S.D. Fee	S.H. Fee	Rest. Del. Fee Remarks
1		Melissa Putnam Ingredion Incorporated Indianapolis Plant 1515 S Drover St Indianapolis IN 46221 (Source CAATS) VIA UPS									
2		Paul Werner Plant Manager Ingredion Incorporated Indianapolis Plant 1515 S Drover St Indianapolis IN 46221 *(RO CAATS)*									
3		Indianapolis Public Library - West Branch 1216 South Kappes St Indianapolis IN 46221 *(Library)*									
4		Indianapolis City Council and Mayors office 200 East Washington Street, Room E Indianapolis IN 46204 *(Local Official)*									
5		Carmel City Council and Mayors Office 1 Civic Square Carmel IN 46032 *(Local Official)*									
6		Marion County Commissioners 200 E. Washington St. City County Bldg., Suite 801 Indianapolis IN 46204 *(Local Official)*									
7		Matt Mosier Office of Sustainability City-County Bldg/200 E Washington St. Rm# 2460 Indianapolis IN 46204 *(Local Official)*									
8		Planning Div., Dept. of Metropolitan Development 1735 S. West St. Indianapolis IN 46225 *(Local Official)*									
9		City of Indianapolis, Attn: General Council 200 East Washington Street, Rm E Indianapolis IN 46204 *(Affected Party)*									
10		Sebastian Valverde 4235 Springwood Trail Indianapolis IN 46228 *(Affected Party)*									
11		Marion County Health Department 3838 North Rural Street Indianapolis IN 46205 *(Local Official)*									
12		Kristine Davies Trinity Consultants 8910 Purdue Road, Suite 670 Indianapolis IN 46268 *(Consultant)*									
13											
14											
15											

Total number of pieces Listed by Sender	Total number of Pieces Received at Post Office	Postmaster, Per (Name of Receiving employee)	The full declaration of value is required on all domestic and international registered mail. The maximum indemnity payable for the reconstruction of nonnegotiable documents under Express Mail document reconstructing insurance is $50,000 per piece subject to a limit of $50, 000 per occurrence. The maximum indemnity payable on Express mil merchandise insurance is $500. The maximum indemnity payable is $25,000 for registered mail, sent with optional postal insurance. See ***Domestic Mail Manual* R900, S913**, and **S921** for limitations of coverage on inured and COD mail. See ***International Mail Manual*** for limitations o coverage on international mail. Special handling charges apply only to Standard Mail (A) and Standard Mail (B) parcels.

FACSIMILIE OF PS Form 3877

From:	Michael Muzychenko
To:	Dedek, Tessa M
Subject:	RE: [EXT] Info Request for Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Date:	Thursday, April 11, 2024 8:25:19 AM
Attachments:	image001.png image002.png image003.png image004.png image005.png image006.png image007.png Copy of Buffing Dust Cost Benefit Calculation - Haubstadt.xlsx

Good morning.

See attached cost analysis for our buffing operations. We have determined the blower system to be integral to the buffing operation as it would be in place regardless of air quality requirements.

Thank you,

Mike

#Safest Operations

Mike Muzychenko, CSP
Environment, Health, & Safety Manager
Commercial Tire & Service Centers

From: Dedek, Tessa M <TDedek@idem.IN.gov>
Sent: Wednesday, April 3, 2024 10:56 AM
To: Michael Muzychenko <michael_muzychenko@goodyear.com>
Subject: [EXT] Info Request for Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

Hi Mike,

Here's some guidance on integral evaluations. The EPA Memo has the criteria we look for. The cost manual has some info and examples of what we look for in the cost analysis. The attached permit has 2 completed integral analyses in the TSD if you want to look at that.

Thanks,

Tessa Dedek
Environmental Engineer

Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment
| | | | | www.idem.IN.gov

Buffing Dust Cost Benefit Calculation - Haubstadt

Initial dust collection Equipment Cost	**$**	**20,000**	**Est**
Avg Lbs. collected per tire		**10.2**	**lbs.**
Recovery$ /LBS.	**$**	**0.04**	

Month	Tires	LBS	Recover $
Jan-23	4,629	47,215.8	$ 1,888.63
Feb-23	3,519	35,893.8	$ 1,435.75
Mar-23	3,537	36,077.4	$ 1,443.10
Apr-23	3,503	35,730.6	$ 1,429.22
May-23	4,142	42,248.4	$ 1,689.94
Jun-23	4,047	41,279.4	$ 1,651.18
Jul-23	3,523	35,934.6	$ 1,437.38
Aug-23	4,309	43,951.8	$ 1,758.07
Sep-23	3,764	38,392.8	$ 1,535.71
Oct-23	3,869	39,463.8	$ 1,578.55
Nov-23	3,113	31,752.6	$ 1,270.10
Dec-23	3,593	36,648.6	$ 1,465.94
Totals	**45,548**	**464,589.6**	**$ 18,583.58**

Rubber dust LBS. not landfilled	**464,589.6**

From:	Dedek, Tessa M
To:	Michael Muzychenko
Subject:	RE: [EXT] Info Request for Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Date:	Thursday, April 11, 2024 1:03:00 PM
Attachments:	image001.png image002.png image003.png image004.png image005.png image006.png image007.png

---

Thank you! I'll review this and let you know if I have any more questions.

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment

From: Michael Muzychenko <michael_muzychenko@goodyear.com>
Sent: Thursday, April 11, 2024 8:24 AM
To: Dedek, Tessa M <TDedek@idem.IN.gov>
Subject: RE: [EXT] Info Request for Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

---

Good morning.

See attached cost analysis for our buffing operations. We have determined the blower system to be integral to the buffing operation as it would be in place regardless of air quality requirements.

Thank you,

Mike

#Safest Operations

Mike Muzychenko, CSP
Environment, Health, & Safety Manager
Commercial Tire & Service Centers

From: Dedek, Tessa M <TDedek@idem.IN.gov>
Sent: Wednesday, April 3, 2024 10:56 AM
To: Michael Muzychenko <michael_muzychenko@goodyear.com>
Subject: [EXT] Info Request for Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

Hi Mike,

Here's some guidance on integral evaluations. The EPA Memo has the criteria we look for. The cost manual has some info and examples of what we look for in the cost analysis. The attached permit has 2 completed integral analyses in the TSD if you want to look at that.

Thanks,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment
| | | | | www.idem.IN.gov

From:	Dedek, Tessa M
To:	Michael Muzychenko
Subject:	RE: [EXT] Info Request for Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Date:	Thursday, April 25, 2024 2:16:00 PM
Attachments:	image001.png image002.png image003.png image004.png image005.png image006.png image007.png Road fugitives.xlsx

---

Hi Mike,

I have a few more questions:

1. Does Goodyear sell the recovered rubber for $0.04/lb somewhere? The process description you sent before stated that the recovered rubber is recycled off site, so I wanted to confirm whether or not it's actually sold.
2. The permit states that there are two tire grinding and repair stations with a maximum capacity of 25 tires per hour. Is that 25 tire/hr each or is it a combined throughput for both stations?
3. Why is the source address changing from 12580 S Northgate Dr to 12624 S Northgate Dr? Has the source moved?
4. Please fill out and return the attached roads calculations template.

Thanks,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov

Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment

From: Michael Muzychenko <michael_muzychenko@goodyear.com>
Sent: Thursday, April 11, 2024 8:24 AM
To: Dedek, Tessa M <TDedek@idem.IN.gov>
Subject: RE: [EXT] Info Request for Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

---

Good morning.

See attached cost analysis for our buffing operations. We have determined the blower system to be integral to the buffing operation as it would be in place regardless of air quality requirements.

Thank you,

Mike

#Safest Operations

Mike Muzychenko, CSP
Environment, Health, & Safety Manager
Commercial Tire & Service Centers

From: Dedek, Tessa M <TDedek@idem.IN.gov>
Sent: Wednesday, April 3, 2024 10:56 AM
To: Michael Muzychenko <michael_muzychenko@goodyear.com>
Subject: [EXT] Info Request for Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

Hi Mike,

Here's some guidance on integral evaluations. The EPA Memo has the criteria we look for. The cost manual has some info and examples of what we look for in the cost analysis. The attached permit has 2 completed integral analyses in the TSD if you want to look at that.

Thanks,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment
| | | | | www.idem.IN.gov

Fugitive Dust Emissions - Unpaved Roads

This calculation is for illustrative purposes only. The emission factors and other data/methodologies used in these calculations are from US EPA's AP-42 Compilation of Air Pollutant Emission Factors. The emission factors, data, methodologies, and assumptions used in these calculations may not be representative/appropriate for a given emission unit/activity. For additional information, please refer to US EPA's AP-42 Compilation of Air Pollutant Emission Factors.

IDEM OAQ does not guarantee the accuracy of these calculations or the emission factors used.

All emission factors and calculations submitted as part of a permit application shall be reviewed by IDEM OAQ Permit Branch for accuracy, completeness, robustness, and appropriateness as part of the permit application review process and a final determination shall be made by the OAQ, Permits Branch.

Unpaved Roads at Industrial Site

The following calculations determine the amount of emissions created by unpaved roads, based on 8,760 hours of use and AP-42, Ch 13.2.2 (11/2006).

Vehicle Information (provided by source)

Type	Maximum number of vehicles	Number of one-way trips per day per vehicle	Maximum trips per day (trip/day)	Maximum Weight of Loaded Vehicle (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)	1.0	1.0	1.0	1.0	1.0	10000	1.894	1.9	691.3
Vehicle (leaving plant) (one-way trip)	1.0	1.0	1.0	1.0	1.0	10000	1.894	1.9	691.3
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
		Totals	**2.0**		**2.0**			**3.8**	**1382.6**

Average Vehicle Weight Per Trip =	1.0	tons/trip
Average Miles Per Trip =	1.89	miles/trip

Unmitigated Emission Factor, Ef = k*[(s/12)^a]*[(W/3)^b] (Equation 1a from AP-42 13.2.2)

	PM	PM10	PM2.5	
where k =	4.9	1.5	0.15	lb/mi = particle size multiplier (AP-42 Table 13.2.2-2 for Industrial Roads)
s =	6.0	6.0	6.0	% = mean % silt content of unpaved roads (AP-42 Table 13.2.2-1 Iron and Steel Production)
a =	0.7	0.9	0.9	= constant (AP-42 Table 13.2.2-2 for Industrial Roads)
W =	1.0	1.0	1.0	tons = average vehicle weight
b =	0.45	0.45	0.45	= constant (AP-42 Table 13.2.2-2 for Industrial Roads)

Taking natural mitigation due to precipitation into consideration, Mitigated Emission Factor, Eext = E * [(365 - P)/365] (Equation 2 from AP-42 13.2.2)

Mitigated Emission Factor, Eext = E * [(365 - P)/365]

where P = 125 days of rain greater than or equal to 0.01 inches (see Fig. 13.2.2-1)

	PM	PM10	PM2.5	
Unmitigated Emission Factor, Ef =	1.84	0.49	0.05	lb/mile
Mitigated Emission Factor, Eext =	1.21	0.32	0.03	lb/mile
Dust Control Efficiency =	TBD	TBD	TBD	(pursuant to control measures outlined in fugitive dust control plan)

Process	Mitigated PTE of PM (Before Control) (tons/yr)	Mitigated PTE of PM10 (Before Control) (tons/yr)	Mitigated PTE of PM2.5 (Before Control) (tons/yr)	Mitigated PTE of PM (After Control) (tons/yr)	Mitigated PTE of PM10 (After Control) (tons/yr)	Mitigated PTE of PM2.5 (After Control) (tons/yr)
Vehicle (entering plant) (one-way trip)	0.42	0.11	0.01	#VALUE!	#VALUE!	#VALUE!
Vehicle (leaving plant) (one-way trip)	0.42	0.11	0.01	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
Totals	**0.84**	**0.22**	**0.02**	**#VALUE!**	**#VALUE!**	**#VALUE!**

Methodology

Total Weight driven per day (ton/day)	= [Maximum Weight of Loaded Vehicle (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)]
Mitigated PTE (Before Control) (tons/yr)	= (Maximum one-way miles (miles/yr)) * (Mitigated Emission Factor (lb/mile)) * (ton/2000 lbs)
Mitigated PTE (After Control) (tons/yr)	= (Mitigated PTE (Before Control) (tons/yr)) * (1 - Dust Control Efficiency)

Abbreviations

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

Fugitive Dust Emissions - Paved Roads

This calculation is for illustrative purposes only. The emission factors and other data/methodologies used in these calculations are from US EPA's AP-42 Compilation of Air Pollutant Emission Factors. The emission factors, data, methodologies, and assumptions used in these calculations may not be representative/appropriate for a given emission unit/activity. For additional information, please refer to US EPA's AP-42 Compilation of Air Pollutant Emission Factors.

IDEM OAQ does not guarantee the accuracy of these calculations or the emission factors used.

All emission factors and calculations submitted as part of a permit application shall be reviewed by IDEM OAQ Permit Branch for accuracy, completeness, robustness, and appropriateness as part of the permit application review process and a final determination shall be made by the OAQ, Permits Branch.

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 Informtation (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 of Loaded Vehicle (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)	1.0	1.0	1.0	1.0	1.0	10000	1.894	1.9	691.3
Vehicle (leaving plant) (one-way trip)	1.0	1.0	1.0	1.0	1.0	10000	1.894	1.9	691.3
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
		Totals	**2.0**		**2.0**			**3.8**	**1382.6**

Average Vehicle Weight Per Trip =	1.0	tons/trip
Average Miles Per Trip =	1.89	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 =	1.0	1.0	1.0	tons = average vehicle weight
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 =	0.087	0.017	0.0043	lb/mile
Mitigated Emission Factor, Eext =	0.080	0.016	0.0039	lb/mile
Dust Control Efficiency =	TBD	TBD	TBD	(pursuant to control measures outlined in fugitive dust control plan)

Process	Mitigated PTE of PM (Before Control) (tons/yr)	Mitigated PTE of PM10 (Before Control) (tons/yr)	Mitigated PTE of PM2.5 (Before Control) (tons/yr)	Mitigated PTE of PM (After Control) (tons/yr)	Mitigated PTE of PM10 (After Control) (tons/yr)	Mitigated PTE of PM2.5 (After Control) (tons/yr)
Vehicle (entering plant) (one-way trip)	0.03	0.01	0.00	#VALUE!	#VALUE!	#VALUE!
Vehicle (leaving plant) (one-way trip)	0.03	0.01	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
Totals	**0.05**	**0.01**	**0.00**	**#VALUE!**	**#VALUE!**	**#VALUE!**

Methodology

Total Weight driven per day (ton/day)	= [Maximum Weight of Loaded Vehicle (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 (Before Control) (tons/yr)	= [Maximum one-way miles (miles/yr)] * [Mitigated Emission Factor (lb/mile)] * (ton/2000 lbs)
Mitigated PTE (After Control) (tons/yr)	= [Mitigated PTE (Before Control) (tons/yr)] * [1 - Dust Control Efficiency]

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

IDEM OAQ does not guarantee the accuracy of the information and calculations below.

All information and calculations submitted as part of a permit application shall be reviewed by IDE
as part of the permit application review process and a final determination shall be made by the OA

The tables below include examples of common vehicles and their approximate weights (unloaded
vehicle weights and maximum load capacities will vary based on the actual type/size/model/capaci
transported in the vehicles at the source.

Vehicle Type	Maximum Weight of Unloaded Vehicle (tons)	Load Capacity (cubic yards)
Dump truck (8 cubic yard capacity)	8.0	6.0
Dump truck (10 cubic yard capacity)	12.5	10.0
Dump truck (12 cubic yard capacity)	14.0	12.0
Dump truck (16 cubic yard capacity)	15.0	16.0
Dump truck (20 cubic yard capacity)	16.0	20.0
Dump truck (24 cubic yard capacity)	20.0	24.0
Front-end loader (3 cubic yard capacity)	15.0	3.0

Vehicle Type	Maximum Weight of Unloaded Vehicle (tons)	Load Capacity (cubic yards)
Passenger Car (4-door)	2.0	0.50
Sport Utility Vehicle (4-door)	3.0	0.60
Pickup Truck	2.5	2.80
Cargo Van	2.6	8.70
Moving Truck (2-axle) (10’ Straight Truck)	2.9	14.8
Moving Truck (2-axle) (14’ Straight Truck)	4.0	24.8
Moving Truck (2-axle) (17’ Straight Truck)	4.1	31.7
Moving Truck (2-axle) (24’ Straight Truck)	5.8	51.9
Moving Truck (2-axle) (26’ Straight Truck)	6.3	59.0
Freight Truck (3 axles)	11.0	NA
Freight Truck (4 axles)	13.0	NA
Freight Truck (5 axles)	15.0	NA

Freight Truck (6 axles)	16.0	NA

Vehicle Type	Maximum Weight of Unloaded Vehicle (tons)	Load Capacity (cubic yards)
Grain Tanker (5 axle bulk dry tanker) (900 bushel capacity)	15.0	40.0

Vehicle Type	Maximum Weight of Unloaded Vehicle (tons)	Load Capacity (gallons)
Tanker Truck (6000 gal)	16.0	6000

Vehicle Type	Maximum Weight of Unloaded Vehicle (tons)	Load Capacity (cubic yards)
Dump truck (8 cubic yard capacity)	8.0	6.0
Dump truck (10 cubic yard capacity)	12.5	10.0
Dump truck (12 cubic yard capacity)	14.0	12.0
Dump truck (16 cubic yard capacity)	15.0	16.0
Dump truck (20 cubic yard capacity)	16.0	20.0
Dump truck (24 cubic yard capacity)	20.0	24.0
Front-end loader (3 cubic yard capacity)	15.0	3.0

M OAQ Permit Branch for accuracy, completeness, robustness, and appropriateness
Q, Permits Branch.

) and maximum load capacities. These are just <u>approximate</u> values and actual
ity of the vehicles used by the source and the type/bulk density of the materials

Material Loaded	Bulk Density of Material (lbs/cubic foot)	Maximum Weight of Load (tons)	Maximum Weight of Loaded Vehicle (tons/trip)
crushed stone, dry sand, or soil	100	8.1	16.1
crushed stone, dry sand, or soil	100	13.5	26.0
crushed stone, dry sand, or soil	100	16.2	30.2
crushed stone, dry sand, or soil	100	21.6	36.6
crushed stone, dry sand, or soil	100	27.0	43.0
crushed stone, dry sand, or soil	100	32.4	52.4
crushed stone, dry sand, or soil	100	4.1	19.1

Material Loaded	Bulk Density of Material (lbs/cubic foot)	Maximum Weight of Load (tons)	Maximum Weight of Loaded Vehicle (tons/trip)
Not Needed (assumed load)	Not Needed (assumed load)	0.7	2.7
Not Needed (assumed load)	Not Needed (assumed load)	1.0	4.0
Not Needed (assumed load)	Not Needed (assumed load)	0.7	3.2
Not Needed (assumed load)	Not Needed (assumed load)	1.9	4.5
Not Needed (assumed load)	Not Needed (assumed load)	1.3	4.2
Not Needed (assumed load)	Not Needed (assumed load)	1.5	5.5
Not Needed (assumed load)	Not Needed (assumed load)	2.9	7.0
Not Needed (assumed load)	Not Needed (assumed load)	3.2	9.0
Not Needed (assumed load)	Not Needed (assumed load)	3.7	10.0
Not Needed (assumed load)	Not Needed (assumed load)	16.0	27.0
Not Needed (assumed load)	Not Needed (assumed load)	22.0	35.0
Not Needed (assumed load)	Not Needed (assumed load)	25.0	40.0

Not Needed (assumed load)	Not Needed (assumed load)	32.0	48.0

Material Loaded	Bulk Density of Material (lbs/cubic foot)	Maximum Weight of Load (tons)	Maximum Weight of Loaded Vehicle (tons/trip)
Grain (corn or soybeans)	46	24.8	39.8

Material Loaded	Bulk Density of Material (lbs/cubic foot)	Maximum Weight of Load (tons)	Maximum Weight of Loaded Vehicle (tons/trip)
water	62.4	25.0	41.0

Material Loaded	Bulk Density of Material (lbs/cubic foot)	Maximum Weight of Load (tons)	Maximum Weight of Loaded Vehicle (tons/trip)
broken coal (bituminous)	52	4.2	12.2
broken coal (bituminous)	52	7.0	19.5
broken coal (bituminous)	52	8.4	22.4
broken coal (bituminous)	52	11.2	26.2
broken coal (bituminous)	52	14.0	30.0
broken coal (bituminous)	52	16.8	36.8
broken coal (bituminous)	52	2.1	17.1

From:	Michael Muzychenko
To:	Dedek, Tessa M
Cc:	Matt Cronin; Michael Muzychenko
Subject:	RE: [EXT] 4-30-2024 Info Request for Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Date:	Tuesday, May 21, 2024 8:28:23 AM
Attachments:	image001.png image003.png image004.png image005.png image006.png image007.png image008.png Copy of Road fugitives.xlsx

Good morning,

See attached paved road spreadsheet.

See below answers as requested:

2. For the water mister mounted on the tire buffer, is the water always applied? Or can the grinding stations operate without it? The mister flow can be adjusted and can be turned off. The machine can still operate with the mister off; however, it will quickly damage the components. As part of our daily pre-shift equipment check, the operator is to verify the water is on and functioning properly. "No water" is an out-of-service condition.
3. What electric usage costs and maintenance/replacement parts costs are there for the direct blower system? – There is no annual maintenance or repair costs. If the unit is damaged, it gets replaced. We are still working to isolate the utilities costs.
   a. For example, please provide the electricity cost in $/hr and the hours of operation in hr/day, day/wk, and wk/yr.
   b. For example, please provide the type of replacement part, the cost per part, and the number of replacements needed per year.
4. Please provide the exhaust locations for the following units (indoors, outdoors, or through a stack). If they exhaust through a stack, please provide the stack ID if there is one.
   a. The two tire grinding and repair stations BUF - indoors
   b. The new electric water heater - Outdoors
   c. The existing tire curing chamber (CUR1) - Outdoors
   d. The new tire curing chamber (CUR2) - Outdoors
5. Is the source general phone number still (812) 306-7431? No, the new number is 812-753-4792.
6. Does the source operating any of the following processes? An undertread cementing operation, a sidewall cementing operation, a tread end cementing operation, a bead

cementing operation, a green tire spraying operation, a Michelin-A operation, a Michelin-B operation, or a Michelin-C automatic operation?

a. Yes - An under tread cementing operation, a sidewall cementing operation, a tread end cementing operation

Thank you,

Mike

#Safest Operations

Mike Muzychenko, CSP
Environment, Health, & Safety Manager
Commercial Tire & Service Centers

From: Dedek, Tessa M <TDedek@idem.IN.gov>
Sent: Tuesday, May 14, 2024 8:54 AM
To: Michael Muzychenko <michael_muzychenko@goodyear.com>
Subject: RE: [EXT] 4-30-2024 Info Request for Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

Hi Mike,

I wanted to check in and see when you think you'll be able to send these answers. I also added a few questions:

1. Please send back the completed roads calcs spreadsheet.
2. For the water mister mounted on the tire buffer, is the water always applied? Or can the grinding stations operate without it?
3. What electric usage costs and maintenance/replacement parts costs are there for the direct blower system?
   a. For example, please provide the electricity cost in $/hr and the hours of operation in hr/day, day/wk, and wk/yr.
   b. For example, please provide the type of replacement part, the cost per part, and the number of replacements needed per year.
4. Please provide the exhaust locations for the following units (indoors, outdoors, or through a stack). If they exhaust through a stack, please provide the stack ID if there is one.
   a. The two tire grinding and repair stations BUF
   b. The new electric water heater
   c. The existing tire curing chamber (CUR1)
   d. The new tire curing chamber (CUR2)
5. Is the source general phone number still (812) 306-7431?
6. Does the source operating any of the following processes? An undertread cementing

operation, a sidewall cementing operation, a tread end cementing operation, a bead cementing operation, a green tire spraying operation, a Michelin-A operation, a Michelin-B operation, or a Michelin-C automatic operation?

Thanks,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment

From: Dedek, Tessa M
Sent: Friday, May 3, 2024 1:56 PM
To: 'Michael Muzychenko' <michael_muzychenko@goodyear.com>
Subject: RE: [EXT] 4-30-2024 Info Request for Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

Hi Mike,

Thanks for these answers. For the roads calcs, there's another tab on the spreadsheet for paved roads, so please fill it out and send it back to me. I also have some more questions:

1. For the water mister mounted on the tire buffer, is the water always applied? Or can the grinding stations operate without it?
2. What electric usage costs and maintenance/replacement parts costs are there for the direct blower system?
   a. For example, please provide the electricity cost in $/hr and the hours of operation in hr/day, day/wk, and wk/yr.
   b. For example, please provide the type of replacement part, the cost per part, and the number of replacements needed per year.

Thanks,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment

From: Michael Muzychenko <michael_muzychenko@goodyear.com>
Sent: Tuesday, April 30, 2024 10:52 AM
To: Dedek, Tessa M <TDedek@idem.IN.gov>
Subject: RE: [EXT] 4-30-2024 Info Request for Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

Good morning,

The attachment you asked for us to fill out is for unpaved roads, however, all our roads are paved. Is this still required?

1. Does Goodyear sell the recovered rubber for $0.04/lb somewhere? The process description you sent before stated that the recovered rubber is recycled off site, so I wanted to confirm whether or not it's actually sold.
    a. It is sold to a recycler for $0.04/lb. The recycler uses it for various products such as playgrounds and synthetic playing surfaces.
2. The permit states that there are two tire grinding and repair stations with a maximum capacity of 25 tires per hour. Is that 25 tire/hr each or is it a combined throughput for both stations?
    a. Each station has the capacity of 25 tires/hour.
3. Why is the source address changing from 12580 S Northgate Dr to 12624 S Northgate Dr? Has the source moved?
    a. The source has not moved. The official address for the plant that I have in my records for Goodyear is 12624 S Northgate Drive.

b. 

Thank you,

Mike

#Safest Operations

Mike Muzychenko, CSP
Environment, Health, & Safety Manager
Commercial Tire & Service Centers

From: Dedek, Tessa M <TDedek@idem.IN.gov>
Sent: Thursday, April 25, 2024 2:17 PM

To: Michael Muzychenko <michael_muzychenko@goodyear.com>
Subject: RE: [EXT] Info Request for Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

Hi Mike,

I have a few more questions:

1. Does Goodyear sell the recovered rubber for $0.04/lb somewhere? The process description you sent before stated that the recovered rubber is recycled off site, so I wanted to confirm whether or not it's actually sold.
2. The permit states that there are two tire grinding and repair stations with a maximum capacity of 25 tires per hour. Is that 25 tire/hr each or is it a combined throughput for both stations?
3. Why is the source address changing from 12580 S Northgate Dr to 12624 S Northgate Dr? Has the source moved?
4. Please fill out and return the attached roads calculations template.

Thanks,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment

From: Michael Muzychenko <michael_muzychenko@goodyear.com>
Sent: Thursday, April 11, 2024 8:24 AM
To: Dedek, Tessa M <TDedek@idem.IN.gov>
Subject: RE: [EXT] Info Request for Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

---

Good morning.

See attached cost analysis for our buffing operations. We have determined the blower system to be integral to the buffing operation as it would be in place regardless of air quality requirements.

Thank you,

Mike

#Safest Operations

Mike Muzychenko, CSP
Environment, Health, & Safety Manager
Commercial Tire & Service Centers

From: Dedek, Tessa M <TDedek@idem.IN.gov>
Sent: Wednesday, April 3, 2024 10:56 AM
To: Michael Muzychenko <michael_muzychenko@goodyear.com>
Subject: [EXT] Info Request for Application No. 051-47201-00047 for The Goodyear Tire & Rubber Company

Hi Mike,

Here's some guidance on integral evaluations. The EPA Memo has the criteria we look for. The cost manual has some info and examples of what we look for in the cost analysis. The attached permit has 2 completed integral analyses in the TSD if you want to look at that.

Thanks,

IDEM EST. 1986

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment
| | | | | www.idem.IN.gov

Fugitive Dust Emissions - Unpaved Roads

This calculation is for illustrative purposes only. The emission factors and other data/methodologies used in these calculations are from US EPA's AP-42 Compilation of Air Pollutant Emission Factors. The emission factors, data, methodologies, and assumptions used in these calculations may not be representative/appropriate for a given emission unit/activity. For additional information, please refer to US EPA's AP-42 Compilation of Air Pollutant Emission Factors.

IDEM OAQ does not guarantee the accuracy of these calculations or the emission factors used.

All emission factors and calculations submitted as part of a permit application shall be reviewed by IDEM OAQ Permit Branch for accuracy, completeness, robustness, and appropriateness as part of the permit application review process and a final determination shall be made by the OAQ, Permits Branch.

Unpaved Roads at Industrial Site

The following calculations determine the amount of emissions created by unpaved roads, based on 8,760 hours of use and AP-42, Ch 13.2.2 (11/2006).

Vehicle Information (provided by source)

Type	Maximum number of vehicles	Number of one-way trips per day per vehicle	Maximum trips per day (trip/day)	Maximum Weight of Loaded Vehicle (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)	0.0	0.0	0.0	0.0	0.0	0	0.000	0.0	0.0
Vehicle (leaving plant) (one-way trip)	0.0	0.0	0.0	0.0	0.0	0	0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
		Totals	**0.0**		**0.0**			**0.0**	**0.0**

Average Vehicle Weight Per Trip =	#DIV/0!	tons/trip
Average Miles Per Trip =	#DIV/0!	miles/trip

Unmitigated Emission Factor, Ef = k*[(s/12)^a]*[(W/3)^b] (Equation 1a from AP-42 13.2.2)

	PM	PM10	PM2.5	
where k =	4.9	1.5	0.15	lb/mi = particle size multiplier (AP-42 Table 13.2.2-2 for Industrial Roads)
s =	6.0	6.0	6.0	% = mean % silt content of unpaved roads (AP-42 Table 13.2.2-1 Iron and Steel Production)
a =	0.7	0.9	0.9	= constant (AP-42 Table 13.2.2-2 for Industrial Roads)
W =	#DIV/0!	#DIV/0!	#DIV/0!	tons = average vehicle weight
b =	0.45	0.45	0.45	= constant (AP-42 Table 13.2.2-2 for Industrial Roads)

Taking natural mitigation due to precipitation into consideration, Mitigated Emission Factor, Eext = E * [(365 - P)/365] (Equation 2 from AP-42 13.2.2)

Mitigated Emission Factor, Eext = E * [(365 - P)/365]

where P = 125 days of rain greater than or equal to 0.01 inches (see Fig. 13.2.2-1)

	PM	PM10	PM2.5	
Unmitigated Emission Factor, Ef =	#DIV/0!	#DIV/0!	#DIV/0!	lb/mile
Mitigated Emission Factor, Eext =	#DIV/0!	#DIV/0!	#DIV/0!	lb/mile
Dust Control Efficiency =	TBD	TBD	TBD	(pursuant to control measures outlined in fugitive dust control plan)

Process	Mitigated PTE of PM (Before Control) (tons/yr)	Mitigated PTE of PM10 (Before Control) (tons/yr)	Mitigated PTE of PM2.5 (Before Control) (tons/yr)	Mitigated PTE of PM (After Control) (tons/yr)	Mitigated PTE of PM10 (After Control) (tons/yr)	Mitigated PTE of PM2.5 (After Control) (tons/yr)
Vehicle (entering plant) (one-way trip)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Vehicle (leaving plant) (one-way trip)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Totals	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**

Methodology

Total Weight driven per day (ton/day)	= [Maximum Weight of Loaded Vehicle (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)]
Mitigated PTE (Before Control) (tons/yr)	= (Maximum one-way miles (miles/yr)) * (Mitigated Emission Factor (lb/mile)) * (ton/2000 lbs)
Mitigated PTE (After Control) (tons/yr)	= (Mitigated PTE (Before Control) (tons/yr)) * (1 - Dust Control Efficiency)

Abbreviations

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

Fugitive Dust Emissions - Paved Roads

This calculation is for illustrative purposes only. The emission factors and other data/methodologies used in these calculations are from US EPA's AP-42 Compilation of Air Pollutant Emission Factors. The emission factors, data, methodologies, and assumptions used in these calculations may not be representative/appropriate for a given emission unit/activity. For additional information, please refer to US EPA's AP-42 Compilation of Air Pollutant Emission Factors.

IDEM OAQ does not guarantee the accuracy of these calculations or the emission factors used.

All emission factors and calculations submitted as part of a permit application shall be reviewed by IDEM OAQ Permit Branch for accuracy, completeness, robustness, and appropriateness as part of the permit application review process and a final determination shall be made by the OAQ, Permits Branch.

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 Informtation (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 of Loaded Vehicle (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)	1.0	1.0	1.0	54.0	54.0	1795200	340.000	340.0	124100.0
Vehicle (leaving plant) (one-way trip)	1.0	1.0	1.0	58.0	58.0	1795200	340.000	340.0	124100.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
			0.0		0.0		0.000	0.0	0.0
		Totals	**2.0**		**112.0**			**680.0**	**248200.0**

Average Vehicle Weight Per Trip =	56.0	tons/trip
Average Miles Per Trip =	340.00	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 =	56.0	56.0	56.0	tons = average vehicle weight
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 =	5.278	1.056	0.2591	lb/mile
Mitigated Emission Factor, Eext =	4.827	0.965	0.2369	lb/mile
Dust Control Efficiency =	TBD	TBD	TBD	(pursuant to control measures outlined in fugitive dust control plan)

Process	Mitigated PTE of PM (Before Control) (tons/yr)	Mitigated PTE of PM10 (Before Control) (tons/yr)	Mitigated PTE of PM2.5 (Before Control) (tons/yr)	Mitigated PTE of PM (After Control) (tons/yr)	Mitigated PTE of PM10 (After Control) (tons/yr)	Mitigated PTE of PM2.5 (After Control) (tons/yr)
Vehicle (entering plant) (one-way trip)	299.49	59.90	14.70	#VALUE!	#VALUE!	#VALUE!
Vehicle (leaving plant) (one-way trip)	299.49	59.90	14.70	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
	0.00	0.00	0.00	#VALUE!	#VALUE!	#VALUE!
Totals	**598.97**	**119.79**	**29.40**	**#VALUE!**	**#VALUE!**	**#VALUE!**

Methodology

Total Weight driven per day (ton/day)	= [Maximum Weight of Loaded Vehicle (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 (Before Control) (tons/yr)	= [Maximum one-way miles (miles/yr)] * [Mitigated Emission Factor (lb/mile)] * (ton/2000 lbs)
Mitigated PTE (After Control) (tons/yr)	= [Mitigated PTE (Before Control) (tons/yr)] * [1 - Dust Control Efficiency]

Abbreviations

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

IDEM OAQ does not guarantee the accuracy of the information and calculations below.

All information and calculations submitted as part of a permit application shall be reviewed by IDE as part of the permit application review process and a final determination shall be made by the OA

The tables below include examples of common vehicles and their <u>approximate</u> weights (unloaded vehicle weights and maximum load capacities will vary based on the actual type/size/model/capaci transported in the vehicles at the source.

Vehicle Type	Maximum Weight of Unloaded Vehicle (tons)	Load Capacity (cubic yards)
Dump truck (8 cubic yard capacity)	8.0	6.0
Dump truck (10 cubic yard capacity)	12.5	10.0
Dump truck (12 cubic yard capacity)	14.0	12.0
Dump truck (16 cubic yard capacity)	15.0	16.0
Dump truck (20 cubic yard capacity)	16.0	20.0
Dump truck (24 cubic yard capacity)	20.0	24.0
Front-end loader (3 cubic yard capacity)	15.0	3.0

Vehicle Type	Maximum Weight of Unloaded Vehicle (tons)	Load Capacity (cubic yards)
Passenger Car (4-door)	2.0	0.50
Sport Utility Vehicle (4-door)	3.0	0.60
Pickup Truck	2.5	2.80
Cargo Van	2.6	8.70
Moving Truck (2-axle) (10’ Straight Truck)	2.9	14.8
Moving Truck (2-axle) (14’ Straight Truck)	4.0	24.8
Moving Truck (2-axle) (17’ Straight Truck)	4.1	31.7
Moving Truck (2-axle) (24’ Straight Truck)	5.8	51.9
Moving Truck (2-axle) (26’ Straight Truck)	6.3	59.0
Freight Truck (3 axles)	11.0	NA
Freight Truck (4 axles)	13.0	NA
Freight Truck (5 axles)	15.0	NA

Freight Truck (6 axles)	16.0	NA

Vehicle Type	Maximum Weight of Unloaded Vehicle (tons)	Load Capacity (cubic yards)
Grain Tanker (5 axle bulk dry tanker) (900 bushel capacity)	15.0	40.0

Vehicle Type	Maximum Weight of Unloaded Vehicle (tons)	Load Capacity (gallons)
Tanker Truck (6000 gal)	16.0	6000

Vehicle Type	Maximum Weight of Unloaded Vehicle (tons)	Load Capacity (cubic yards)
Dump truck (8 cubic yard capacity)	8.0	6.0
Dump truck (10 cubic yard capacity)	12.5	10.0
Dump truck (12 cubic yard capacity)	14.0	12.0
Dump truck (16 cubic yard capacity)	15.0	16.0
Dump truck (20 cubic yard capacity)	16.0	20.0
Dump truck (24 cubic yard capacity)	20.0	24.0
Front-end loader (3 cubic yard capacity)	15.0	3.0

M OAQ Permit Branch for accuracy, completeness, robustness, and appropriateness
.Q, Permits Branch.

) and maximum load capacities. These are just <u>approximate</u> values and actual
ity of the vehicles used by the source and the type/bulk density of the materials

Material Loaded	Bulk Density of Material (lbs/cubic foot)	Maximum Weight of Load (tons)	Maximum Weight of Loaded Vehicle (tons/trip)
crushed stone, dry sand, or soil	100	8.1	16.1
crushed stone, dry sand, or soil	100	13.5	26.0
crushed stone, dry sand, or soil	100	16.2	30.2
crushed stone, dry sand, or soil	100	21.6	36.6
crushed stone, dry sand, or soil	100	27.0	43.0
crushed stone, dry sand, or soil	100	32.4	52.4
crushed stone, dry sand, or soil	100	4.1	19.1

Material Loaded	Bulk Density of Material (lbs/cubic foot)	Maximum Weight of Load (tons)	Maximum Weight of Loaded Vehicle (tons/trip)
Not Needed (assumed load)	Not Needed (assumed load)	0.7	2.7
Not Needed (assumed load)	Not Needed (assumed load)	1.0	4.0
Not Needed (assumed load)	Not Needed (assumed load)	0.7	3.2
Not Needed (assumed load)	Not Needed (assumed load)	1.9	4.5
Not Needed (assumed load)	Not Needed (assumed load)	1.3	4.2
Not Needed (assumed load)	Not Needed (assumed load)	1.5	5.5
Not Needed (assumed load)	Not Needed (assumed load)	2.9	7.0
Not Needed (assumed load)	Not Needed (assumed load)	3.2	9.0
Not Needed (assumed load)	Not Needed (assumed load)	3.7	10.0
Not Needed (assumed load)	Not Needed (assumed load)	16.0	27.0
Not Needed (assumed load)	Not Needed (assumed load)	22.0	35.0
Not Needed (assumed load)	Not Needed (assumed load)	25.0	40.0

Not Needed (assumed load)	Not Needed (assumed load)	32.0	48.0

Material Loaded	Bulk Density of Material (lbs/cubic foot)	Maximum Weight of Load (tons)	Maximum Weight of Loaded Vehicle (tons/trip)
Grain (corn or soybeans)	46	24.8	39.8

Material Loaded	Bulk Density of Material (lbs/cubic foot)	Maximum Weight of Load (tons)	Maximum Weight of Loaded Vehicle (tons/trip)
water	62.4	25.0	41.0

Material Loaded	Bulk Density of Material (lbs/cubic foot)	Maximum Weight of Load (tons)	Maximum Weight of Loaded Vehicle (tons/trip)
broken coal (bituminous)	52	4.2	12.2
broken coal (bituminous)	52	7.0	19.5
broken coal (bituminous)	52	8.4	22.4
broken coal (bituminous)	52	11.2	26.2
broken coal (bituminous)	52	14.0	30.0
broken coal (bituminous)	52	16.8	36.8
broken coal (bituminous)	52	2.1	17.1

From: Michael Muzychenko
To: Dedek, Tessa M
Subject: Automatic reply: [EXT] Applicant Review for Registration AA No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Date: Monday, June 10, 2024 4:01:13 PM

---

michael_muzychenko@goodyear.com is no longer a valid Goodyear email account.

Recipient will not see your email message.

If you were contacting the recipient regarding Goodyear business, please
resend your email to manager **Chris Campbell (c_campbell@goodyear.com)**

From:	Dedek, Tessa M
To:	c_campbell@goodyear.com
Subject:	RE: Applicant Review for Registration AA No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Date:	Monday, June 24, 2024 1:01:00 PM
Attachments:	image001.png image002.png image003.png image004.png image005.png image006.png image007.png

Hi Chris,

I'm checking in on my email from 6/11. Who at Goodyear is taking over as the source contact for the Haubstadt location?

Thanks,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment

From: Dedek, Tessa M
Sent: Tuesday, June 11, 2024 7:36 AM
To: c_campbell@goodyear.com
Subject: FW: Applicant Review for Registration AA No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Importance: High

Hi Chris,

Yesterday I sent the updated permit files for The Goodyear Tire & Rubber Company located in Haubstadt, Indiana, to Mike Muzychenko. I got an automatic reply that Mike is no longer with Goodyear and that you could be contacted with questions.

Mike was listed as the source contact for this site. Can you please send me the name, email address, mailing address, and phone number of the new source contact?

Thank you!

Tessa Dedek
Environmental Engineer

Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment

From: Dedek, Tessa M
Sent: Monday, June 10, 2024 4:01 PM
To: Michael Muzychenko <michael_muzychenko@goodyear.com>
Subject: Applicant Review for Registration AA No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Importance: High

Dear Mike,

Attached please find the draft Registration Administrative Amendment (AA) and supporting documents for review. As a courtesy, this draft is being provided to you for an opportunity to review and provide comments prior to the issuance of the permit approval.

The time clock for Registration AA No. 051-47201-00047 will be stopped during your review until you either provide comments or indicate that you do not have any comments. Due to permit accountability and IDEM's intention to issue the permit in a timely manner, you are being allotted **one week** to provide comments in writing. If you have any conflicts or special circumstances that would impede your review process during the time allotted, please notify me directly at the email address or phone number listed below as soon as possible. If you have not responded on or before **Monday, June 17, 2024**, IDEM will assume that you have no comments pertaining to this draft and all files will be forwarded for issuance.

During this review period, I will be available to address your concerns, answer any questions that you may have, or make necessary revisions to this draft.

Pursuant to 326 IAC 2-1.1-7, the fee for this permitting action is expected to be $0.00, which is based on the following:

$0	*Registration Administrative Amendment*

Please note: This is not a bill. This represents the anticipated fee and is subject to change if additional review is required or the permit level changes for some reason (e.g. an additional NESHAP review is required). You will receive a final bill from the OAQ Permits Administration and Support Section.

Sincerely,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment
| | | | | www.idem.IN.gov

Help us improve!
IDEM values your feedback

From:	Michael Phelps
To:	Dedek, Tessa M
Subject:	RE: [EXT] FW: Applicant Review for Registration AA No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Date:	Monday, June 24, 2024 3:40:01 PM
Attachments:	image008.png image004.png image005.png image006.png image007.png image018.png image019.png

---

I believe everything is fine

Mike Phelps
Retread Plant Manager
Goodyear CTSC 314
12624 S. Notrhgate Dr.
Haubstadt IN 47639
Office 812-753-4792
Fax 812-753-4981
Cell 812-306-7431

From: Dedek, Tessa M <TDedek@idem.IN.gov>
Sent: Monday, June 24, 2024 12:03 PM
To: Michael Phelps <michael_phelps@goodyear.com>
Subject: [EXT] FW: Applicant Review for Registration AA No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Importance: High

Hi Mike,

I wanted to check in and see if you've had a chance to review the permit files. Can you please look over the updates and let me know if everything is correct?

Thanks,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment

From: Dedek, Tessa M
Sent: Wednesday, June 12, 2024 9:14 AM
To: michael_phelps@goodyear.com
Subject: FW: Applicant Review for Registration AA No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Importance: High

Hi Mike,

Thanks for helping me move the permit forward. Could you please review the permit updates for The Goodyear Tire & Rubber Company in Haubstadt, IN?

1. Permit
   a. Please review section A.2 and double check that the emission unit descriptions are correct. I'll make a note to update the description for CUR1 and CUR2 and state that they exhaust indoors. If the electric water heater should be removed, please let me know.
2. TSD (Technical Support Document)
   a. Please review the 'Description of Amendment' (page 3) and 'Proposed Changes' (page 9) sections. The 'Proposed Changes' section shows the exact permit updates in bold/strikethrough. It includes the new permit conditions D.1.4 and D.1.5, which would require additional compliance actions for Goodyear.
3. Calcs (Calculations)
   a. There are several updates to the calcs that you can review if you'd like. The 'Paved Roads' tab is new and every other tab has been updated except the 'Tire Repair REP' tab.

Thank you!

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management

Protecting Hoosiers and Our Environment

From: Dedek, Tessa M
Sent: Monday, June 10, 2024 4:01 PM
To: Michael Muzychenko <michael_muzychenko@goodyear.com>
Subject: Applicant Review for Registration AA No. 051-47201-00047 for The Goodyear Tire & Rubber Company
Importance: High

Dear Mike,

Attached please find the draft Registration Administrative Amendment (AA) and supporting documents for review. As a courtesy, this draft is being provided to you for an opportunity to review and provide comments prior to the issuance of the permit approval.

The time clock for Registration AA No. 051-47201-00047 will be stopped during your review until you either provide comments or indicate that you do not have any comments. Due to permit accountability and IDEM's intention to issue the permit in a timely manner, you are being allotted **one week** to provide comments in writing. If you have any conflicts or special circumstances that would impede your review process during the time allotted, please notify me directly at the email address or phone number listed below as soon as possible. If you have not responded on or before **Monday, June 17, 2024**, IDEM will assume that you have no comments pertaining to this draft and all files will be forwarded for issuance.

During this review period, I will be available to address your concerns, answer any questions that you may have, or make necessary revisions to this draft.

Pursuant to 326 IAC 2-1.1-7, the fee for this permitting action is expected to be $0.00, which is based on the following:

$0	*Registration Administrative Amendment*

Please note: This is not a bill. This represents the anticipated fee and is subject to change if additional review is required or the permit level changes for some reason (e.g. an additional NESHAP review is required). You will receive a final bill from the OAQ Permits Administration and Support Section.

Sincerely,

Tessa Dedek
Environmental Engineer
Office of Air Quality
(317) 234-5401 • tdedek@idem.IN.gov
Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment
| | | | | www.idem.IN.gov

Help us improve!
IDEM values your feedback

BILLING WORKSHEET
MSOP, Registration, Exemptions
For Applications Received On and After October 1, 2019

Permit #: 051-47201-00047
Permit Reviewer: Tessa Dedek
Application Received Date: 11/8/2023

Instructions: Permit Reviewers will fill out yellow-highlighted cells (as necessary) and check the appropriate box or fill in the number of reviews. The total fee will be calculated at the bottom and transferred to the billing amount on the first page. Permit Reviewers will change the bottom worksheet tab color to yellow to indicate the permit billing worksheet that was filled out. PASS staff will fill out the green-highlighted cells (as necessary).

Note: See "Transition scenarios - permits and fees" document located in SharePoint for more information on handling transition permits and associated fees.

MSOP Fees			
☐		$100	MSOP
☐		$600	MSOP w/NSR (120)*
☐		$3,500	MSOP w/NSR (120)*
☐		$600	MSOP Min Permit Revision (45)
☐		$100	MSOP Renewal
☐		$600	MSOP Renewal / Minor NSR (120)*
☐		$3,500	MSOP Renewal / Sig NSR (120)*
☐		$3,500	MSOP NSC (Minor PSD/EO) (120)
☐		$6,000	MSOP NSC (Major PSD/EO) (270)
☐		$3,500	MSOP SPR (Minor PSD/EO) (120)
☐		$6,000	MSOP SPR (Major PSD/EO) (270)
☐		$100	MSOP Relocation

** Bill $600 when the permit includes a modification (new or modified equipment) at MPR levels. Bill $3500 when the permit includes a modification (new or modified equipment) at SPR levels.*

Registration Fees			
☐		$600	Registration – (New Source subject to 326 IAC 2-5.1-2)
☐		$100	Registration Relocation
☐		$600	Registration Revision and Re-Registration – (Existing Sources subject to 326 IAC 2-5.5)

Exemption Fees			
☐		$100	Exemption

NSPS / NESHAP / 326 IAC 8-1-6 BACT / 326 IAC 2-4.1 MACT Review			
Number of Reviews	Total Fee	Fee	*See "NSPS-NESHAP-BACT Billing Info" document for instructions.*
		$500	for each review for an applicable NSPS
		$500	for each review for an applicable NESHAP
		$600	times each 326 IAC 8-1-6 BACT and each 326 IAC 2-4.1 MACT

For each best available control technology (BACT) analysis for VOC under 326 IAC 8-1-6 and for each maximum achievable control technology (MACT) under 326 IAC 2-4.1. [326 IAC 2-1.1-7(m)(5)]

Other Fees			
☐		$500	Interim – Any type
☐		$500	Public Hearing

$0 **Total Applicable Fee**

OAQ Permits Branch Invoice Worksheet

Instructions: Permit Reviewers will fill out yellow-highlighted cells (as necessary). Permit Reviewers will change the bottom worksheet tab color to yellow to indicate the permit billing worksheet that was filled out. PASS staff will fill out the green-highlighted cells (as necessary).

Source Name: The Goodyear Tire & Rubber Company

TEMPO AI: 37693

Permit #: 051-47201-00047

CST #:

Credit for permit fees: $

Credit Received Date:

Note: IDEM's accounting office requires that fee bills or refunds, be sent to the accounts Department at the billing address listed on application. If a courtesy copy is needed, please indicate at the bottom of this page.

Permit Reviewer please indicate applicable fees on page #2. Total will carry over to this page.

Total Due:	$	$0
Total Credit:	$	$0
Total Permitting Fees Applicable:	$	$0

Total Refund Due: $

Reason for Refund:

Adjustments to Applicable Fees: $

Explanation of adjustments:

A courtesy copy of the billing has been requested by the applicant, please send to:

Name/Title: N/A

Address: N/A

Permit Reviewer: Tessa Dedek

Date: 11/27/2023