Mr. Melvin Spaulding
Consolidated Grain and Barge Co.
P.O. Box 548
Mount Vernon, Indiana 47620-0548

Re: 129-12920-00035
Administrative Amendment to
Source Modification 129-12235 00035

Dear Mr. Spaulding:

Consolidated Grain and Barge Co. was issued a Source Modification permit on October, 20, 2000 for soybean oil extraction plant. A letter requesting a change to correct typographical error was received on October 30, 2000. Pursuant to the provisions of 2-7-11 the permit is hereby administratively amended as follows (changes are bolded and deletions are strike-through for emphasis):

Request 1: To enable Condition D.2.5(b) to agree with Condition D.2.4, two words should be deleted. Accordingly, please revise the condition as follows: "To document compliance with Condition D.2.4, the Permittee shall maintain records of visible emission notations of the boiler stack exhausts ~~once per shift~~".

Response 1: In order not to construed that visible emission notation is required once per shift even during night time and when the process is not in operation, Condition D.2.5(b) was revised as you proposed. See below changes.

D.2.5(b) To document compliance with Condition D.2.4, the Permittee shall maintain records of visible emission notations of the boiler stack exhausts. ~~once per shift~~

Request 2: In Condition D.1.2, two words have been inadvertently omitted from the applicable NSPS, which may result in a misinterpretation of the PM and opacity limits. The 0.01 gr/dscf PM limit and the 0 percent opacity limit are applicable to only process emissions, which are defined as ".....means the particulate matter which is collected by a capture system. Accordingly, please revise the first sentence of this condition as follows: "Pursuant to 40 CFR Subpart DD 60.302(b), **process emission** gasses discharged into the atmosphere from the:" Please revise the last sentence of this condition as follows: "**Process emission** gasses from these sources shall not exhibit greater than 0 percent opacity." These clarifications will eliminate any potential confusion between the applicability of the limitations of this and the succeeding conditions which relates to fugitive NSPS limits.

Response 2: Condition D.1.2 was revised, the term “gasses” was replaced by “process emission” which is verbatim from the NSPS. Revision is as follows:

D.1.2 New Source Performance Standards(NSPS) Grain Elevators [326 IAC 12] [40 CFR Subpart DD 60.302(b)]

Pursuant to 40 CFR Subpart DD 60.302(b), **process emissions** ~~gases~~ discharged into the atmosphere from the:

(a) north truck only receiving pit; north house bin loading area elevator and conveyors; north storage/loadout area conveyors;

(b) receiving area P1 truck only receiving pit, belt conveyor system, aspirated receiving leg, drag conveyor and covered belt conveyor;

(c) receiving area P2 hopper bottom truck and rail receiving pits, drag conveyors and aspirated receiving legs;

(d) barge receiving area clamshell crane or bucket unloading, aspirated hopper, belt/mass flow conveyors, conveyor system and bucket elevators;

(e) drag conveyors comprising two conveyance systems between the storage silos and elevator legs; elevator legs; conveyor between the elevator legs and magnet;

(f) cleaning system cleaner, aspirators, hoppers, and scale; and

(g) L-Path drag conveyor; drag conveyor to the jet dryers;

shall not exceed particulate matter (PM) concentrations of 0.01 gr/dscf. **Process emissions** ~~Gases~~ from these facilities shall not exhibit greater than 0 percent opacity.

Request 3: Condition D.1.18, as documented in the TSD addendum, an inspection of the external surface of the process cyclone collectors would require removal of insulation and heat tracing. It was agreed that this is not practical and therefore this part was modified. However, the reference to “external” was inadvertently not deleted. Please revise this condition as fallows: “An inspection ~~of the external surface~~ shall be performed as least annually of all cyclone...”

Response 3: It was IDEM, OAM’s intention to not require an inspection of the external surface of the cyclones, due to the insulated nature of the cyclones, as what was stated in the Response 12 of the TSD Addendum. Therefore, Condition D.1.18 was revised as follows:

D.1.18 Cyclone Inspections

An inspection ~~of the external surface~~ shall be performed at least annually of all cyclones controlling the Cleaning System, Jet Dryers, CCD Dryers, CCC Coolers, Cracking and Dehulling, Hull Screening/Aspiration, Hull Pellet Cooler, DTDC Dryers, DTDC Cooler operations when venting to the atmosphere.

Technical Support Document Changes

Request 1: TSD Appendix A.2.1, the unit for the VOC BACT limits for the mineral oil absorber (page 31), meal dryer (page 33), and meal cooler (page 34) contains a typographical error. The unit should be in **pounds** ~~gallons~~ hexane/ton of soybeans crushed, as it is correctly denoted in condition D.1.7.

Response 1: Pages 31, 33 and 34 were revised to reflect the units in pounds hexane/ton of soybeans crushed.

All other conditions of the permit shall remain unchanged and in effect. Please attach a copy of this amendment and the following revised permit pages to the front of the original permit.

This decision is subject to the Indiana Administrative Orders and Procedures Act - IC 4-21.5-3-5. If you have any questions on this matter, please contact (Aida De Guzman), at (800) 451-6027, press 0 and ask for (Aida De Guzman) or extension (3-4972), or dial (317) 233-4972.

Sincerely,

Paul Dubenetzky, Chief
Permits Branch
Office of Air Management

Attachments
APD

cc: File -Posey County
U.S. EPA, Region V
Posey County Health Department
Southwest Regional Office
Air Compliance Section Inspector - Scott Anslinger
Compliance Data Section - Karen Nowak
Administrative and Development - Janet Mobley
Technical Support and Modeling - Michele Boner

PART 70 SIGNIFICANT SOURCE MODIFICATION
OFFICE OF AIR MANAGEMENT

Consolidated Grain and Barge Company
Bluff Road
Mount Vernon, Indiana 47620

(herein known as the Permittee) is hereby authorized to construct and operate subject to the conditions contained herein, the emission units described in Section A (Source Summary) of this approval.

This approval 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.

Source Modification No.: 129-12235-00035	
Issued by: Paul Dubenetzky, Branch Chief Office of Air Management	Issuance Date: October 20, 2000
Administrative Amendment No.: 129-12920-00035	Pages Affected: 24, 31 & 35
Issued by: Paul Dubenetzky, Branch Chief Office of Air Management	

cont.

(rrr) two (2) rail loadout systems that operates at a maximum total capacity of 383.3 tons per hour, based on only one system operating at a time, and control PM emissions with one (1) baghouse (C15) that exhausts to Stack 15;

(sss) one (1) reversible enclosed conveyor system that has the ability to receive soybeans from the barge to the truck and rail receiving leg at a maximum rate of 540 tons per hour or transfer soybean meal from the lower surge to the barge loadout system at a maximum rate of 383.3 tons;

(ttt) one (1) barge loadout system that operates at a maximum capacity of 383.3 tons per hour and controls PM emissions with one (1) baghouse (C15) that exhausts to Stack 15;

Emission Limitations and Standards [326 IAC 2-7-5(1)]

D.1.1 General Provisions Relating to NSPS [326 IAC 12-1][40 CFR Part 60, Subpart A]

The provisions of 40 CFR Part 60, Subpart A - General Provisions, which are incorporated by reference in 326 IAC 12-1, apply to the affected facilities described in this section except when otherwise specified in 40 CFR Part 60, Subpart DD.

D.1.2 New Source Performance Standards(NSPS) Grain Elevators [326 IAC 12] [40 CFR Subpart DD 60.302(b)]

Pursuant to 40 CFR Subpart DD 60.302(b), process emissions discharged into the atmosphere from the:

(a) north truck only receiving pit; north house bin loading area elevator and conveyors; north storage/loadout area conveyors;

(b) receiving area P1 truck only receiving pit, belt conveyor system, aspirated receiving leg, drag conveyor and covered belt conveyor;

(c) receiving area P2 hopper bottom truck and rail receiving pits, drag conveyors and aspirated receiving legs;

(d) barge receiving area clamshell crane or bucket unloading, aspirated hopper, belt/mass flow conveyors, conveyor system and bucket elevators;

(e) drag conveyors comprising two conveyance systems between the storage silos and elevator legs; elevator legs; conveyor between the elevator legs and magnet;

(f) cleaning system cleaner, aspirators, hoppers, and scale; and

(g) L-Path drag conveyor; drag conveyor to the jet dryers;

shall not exceed particulate matter (PM) concentrations of 0.01 gr/dscf. Process emissions from these facilities shall not exhibit greater than 0 percent opacity.

D.1.17 Broken or Failed Bag Detection

In the event that bag failure has been observed:

(a) The affected compartments will be shut down immediately until the failed units have been repaired or replaced. Within eight (8) hours of the determination of failure, response steps according to the timetable described in the Compliance Response Plan shall be initiated. For any failure with corresponding response steps and timetable not described in the Compliance Response Plan, response steps shall be devised within eight (8) hours of discovery of the failure and shall include a timetable for completion. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of 326 IAC 2-7-16 including timely notification, prompt corrective action to mitigate emissions, and specifically the requirements outlined in 326 IAC 2-7-16(g).

(b) For single compartment baghouses, failed units and the associated process will be shut down immediately until the failed units 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 326 IAC 2-7-16 including timely notification, prompt corrective action to mitigate emissions, and specifically the requirements outlined in 326 IAC 2-7-16(g).

D.1.18 Cyclone Inspections

An inspection shall be performed at least annually of all cyclones controlling the Cleaning System, Jet Dryers, CCD Dryers, CCC Coolers, Cracking and Dehulling, Hull Screening/Aspiration, Hull Pellet Cooler, DTDC Dryers, DTDC Cooler operations when venting to the atmosphere.

D.1.19 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. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of 326 IAC 2-7-16 including timely notification, prompt corrective action to mitigate emissions, and specifically the requirements outlined in 326 IAC 2-7-16(g).

D.1.20 VOC Monitoring

The following parameters shall be monitored for the extraction process:

(a) The inlet vacuum pressure of the vapor stream to the absorber shall not exceed 10 inches of water and the flow rate of the mineral oil through the absorber shall not be less than 15 gallons per minute. When the process is in operation, an electronic data management system (EDMS) shall record the instantaneous inlet vacuum pressure and flow rate on a frequency of not less than every 15 minutes.

(b) The temperature of the mineral oil entering the absorber shall be kept in a range of 70 to 105 degrees Fahrenheit (^{o}F). When the process is in operation, an electronic data management system (EDMS) shall record the instantaneous temperature on a frequency of not less than every 15 minutes.

(c) The temperature of the soybean oil entering the mineral-oil-stripping column shall not be less than 200 degrees Fahrenheit (^{o}F) for adequate stripping of the absorbed hexane from the oil. When the process is in operation, an EDMS shall record the instantaneous temperature on a frequency of not less than every 15 minutes.

Record Keeping and Reporting Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

D.2.5 Record Keeping Requirements [326 IAC 12] [40 CFR 60.48c]

(a) Pursuant to 326 IAC 12 and 40 CFR 60.48c (g), the owner or operator shall record and maintain monthly records of the amount of natural gas combusted in each of the boilers.

(b) To document compliance with Condition D.2.4, the Permittee shall maintain records of visible emission notations of the boiler stack exhausts.

(c) All records shall be maintained in accordance with Section C - General Record Keeping Requirements, of this permit.

TSD APPENDIX A.1.1

Existing Permitted Facility Emissions Based on CP-129-7488 (as amended)

CG&B **Emissions Estimate** 16-Aug-99

TRUCK ONLY / RAIL RECEIVING PROCESS

Truck Only Receiving P1

PM Emission Factor	0.18	lb/ton	(Table 9.9.1-1, Straight Truck Receiving AP-42, 5/98)
PM10 Emission Factor	0.059	lb/ton	
PM10/PM ratio	0.328		
Unloading rate/hour	540	tons	
Unloading rate/year	882,877	tons (crush capacity)	
Capture efficiency	95	%	

Potential PM emissions due to soybean unloading excluding fugitive emissions = Emission factor * process rate * Capture efficiency/100

a. Max Hourly = (0.18 lb/ton)*(540 ton/hour)*(95/100)
= 92.3 lbs/hour

b. Max Yearly = (0.18lb/ton)*(882,877 ton/year)*(95/100)/(2000 lb/ton)
= 75.5 tons/year

Potential PM10 emissions due to soybean unloading excluding fugitive emissions = Emission factor * process rate * Capture efficiency/100

a. Max Hourly = (0.059lb/ton)*(540 ton/hour)*(95/100)
= 30.3 lbs/hour

b. Max Yearly = (0.059 lb/ton)*(882,877 ton/year)*(95/100)/(2000 lb/ton)
= 24.7 tons/year

Potential Fugitive PM emissions due to soybean unloading = Emission factor * process rate * (100-Capture efficiency)/100

a. Max Hourly = (0.18 lb/ton)*(540 ton/hour)*((100-95)/100)
= 4.9 lbs/hour

b. Max Yearly = (0.18 lb/ton)*(882,877 ton/year)*((100-95)/100)/(2000 lb/ton)
= 4.0 tons/year

Potential Fugitive PM10 emissions due to soybean unloading = Emission factor * process rate * (100-Capture efficiency)/100

a. Max Hourly = (0.059 lb/ton)*(540 ton/hour)*((100-95)/100)
= 1.6 lbs/hour

b. Max Yearly = (0.059 lb/ton)*(882,877 ton/year)*(95/100)/(2000 lb/ton)
= 1.3 tons/year

Maximum controlled PM emissions from truck only receiving and receiving legs filter = baghouse outlet grain loading * gas flow rate

Truck only filter	13,000	cfm	
Outlet loading	0.005	gr/cfm	11/11/98 compliance test: 0.000365 gr/cfm
PM10/PM Ratio	1		

a. Max Hourly = (0.005 gr/scf)*(13,000 cfm)*(60 min/hour)/(7000 grains/lb)
= 0.56 pounds/hour

b. Max Yearly = max hourly* 8,760 hrs/yr / 2000 lb/ton
2.44 tons/year

Maximum controlled PM10 emissions from truck only receiving and receiving legs filter = baghouse outlet grain loading * gas flow rate

a. Max Hourly = (0.005 gr/scf)*13,000 cfm *60 min/hour /7000 grains/lb
= 0.56 pounds/hour

b. Max Yearly = max hourly* (8,760hrs/yr) /(2000 lb/ton)
2.44 tons/year

Rail Receiving P2

(choke unloading only - railcar)

PM Emission Factor	0.035	lb/ton	(Table 9.9.1-1, Rail Receiving AP-42, 5/98)
PM10 Emission Factor	0.0078	lb/ton	
PM10/PM ratio	0.223		
Unloading rate/hour	540	tons	
Unloading rate/year	882,877	tons	
Capture efficiency	60	% due to shed enclosure	

Potential PM emissions due to soybean unloading = Emission factor * process rate

a. Max Hourly = (lb/ton)*(540 ton/hour)
= 18.9 lbs/hour

b. Max Yearly = (lb/ton)*(882,877 ton/year)/(2000 lb/ton)
= 15.5 tons/year

Potential PM10 emissions due to soybean unloading = Emission factor * process rate

a. Max Hourly = (lb/ton)*(540 ton/hour)
= 4.2 lbs/hour

b. Max Yearly = (lb/ton)*(882,877 ton/year)/(2000 lb/ton)
= 3.4 tons/year

Maximum controlled PM emissions due to soybean unloading = Emission factor * process rate * (100-Capture efficiency)/100

a. Max Hourly = (lb/ton)*(540 ton/hour)*((100-eff.)/100)
= 7.6 lbs/hour

b. Max Yearly = (lb/ton)*(882,877 ton/year)*((100-eff.)/100)/(2000 lb/ton)
= 6.2 tons/year

Maximum controlled PM10 emissions due to soybean unloading = Emission factor * process rate * (100-Capture efficiency)/100

a. Max Hourly	=	(lb/ton)*(540 ton/hour)*((100-eff.)/100)	
	=	1.7	lbs/hour
b. Max Yearly	=	(lb/ton)*(882,877 ton/year)*(eff./100)/(2000 lb/ton)	
	=	1.4	tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for the truck & rail receiving process	=	$55.0* P^{0.11} - 40$	lbs/hour
	=	$55.0*1080^{0.11} - 40$	
	=	78.6	lbs/hour
	=	78.6*8760/2000	tons/year
	=	344	tons/year
Potential PM emissions from truck & rail receiving process	=	receiving pit PM	
	=	94.9	tons/year
	=	Construction Permit PM emissions Limits	
State allowable PM emissions from the truck & rail receiving process for the purpose of permitting			
	=	2.44	tons/year
	=	1.11	pounds /hour
Requested:			
	=	Construction Permit PM emissions Limits	
State allowable PM emissions from the truck & rail receiving process for the purpose of permitting			
	=	8.6	tons/year
	=	8.1	pounds /hour

SOYBEAN STORAGE HANDLING PROCESS

Note: All handling equipment is totally enclosed. Therefore, potential emissions from the same are zero.

Soybean Grain Storage Silos P2A

Silo loading - ANNEX:

PM Emission Factor	0.03	lb/ton	(Table 9.9.1-3, Scale bin vent, Draft AP-42, May 1994)
PM10 Emission Factor	0.015	lb/ton	
PM10/PM ratio	0.5		
Loading rate/hour	1080	tons	
Loading rate/year	882,877	tons	
Mineral oil control efficiency	90	%	(Mineral oil + settling chamber effect of silo)

Potential PM emissions due to soybean bin loading	=	Emission factor * process rate	
a. Max Hourly	=	(0.03 lb/ton)*(1080 ton/hour)	
	=	32.4	lbs/hour
b. Max Yearly	=	(0.03 lb/ton)*(571,302 ton/year)/(2000 lb/ton)	
	=	13.2	tons/year
Potential PM10 emissions due to soybean bin loading	=	Potential PM Emissions * PM10/PM ratio	

a. Max Hourly = 32.4 lb/hour * 0.5
= 16.2 lbs/hour

b. Max Yearly = 8.6 * 0.5
= 6.6 tons/year

Maximum controlled PM emissions from storage bin loading = Potential PM emissions * (100 - control efficiency)/100

a. Max Hourly = 32.4 lb/hr * (100-90)/100
= 3.2 lbs/hour

b. Max Yearly = 8.6 lb/hr * (100-90)/100
= 1.3 tons/year

Maximum controlled PM10 emissions from storage bin loading = Potential PM10 emissions * (100- mineral oil control efficiency)/100

a. Max Hourly = 16.2 lb/hr * (100-90)/100
= 1.6 lbs/hour

b. Max Yearly = 4.3 ton/yr * (100-90)/100
= 0.7 tons/year

Silo loading - MERCHANDIZING HOUSE:

PM Emission Factor	0.03	lb/ton	(Table 9.9.1-3, Scale bin vent, Draft AP-42, May 1994)
PM10 Emission Factor	0.015	lb/ton	
PM10/PM ratio	0.5		
Loading rate/hour	1340	tons - maximum	
Loading rate/year	826,271	tons	
Settling chamber effect of silo	70	%	

Potential PM emissions due to soybean bin loading = Emission factor * process rate

a. Max Hourly = (0.03 lb/ton)*(ton/hour)
= 40.2 lbs/hour

b. Max Yearly = (0.03 lb/ton)*(ton/year)/(2000 lb/ton)
= 12.4 tons/year

Potential PM10 emissions due to soybean bin loading = Potential PM Emissions * PM10/PM ratio

a. Max Hourly = lb/hour * 0.5
= 20.1 lbs/hour

b. Max Yearly = lb/hour * 0.5
= 6.2 tons/year

Maximum controlled PM emissions from storage bin loading = Potential PM emissions * (100 - control efficiency)/100

a. Max Hourly = lb/hr * (100-70)/100
= 12.1 lbs/hour

b. Max Yearly = lb/hr * (100-70)/100
= 3.7 tons/year

Maximum controlled PM10 emissions from storage bin loading = Potential PM10 emissions * (100- control efficiency)/100

a. Max Hourly = lb/hr * (100-70)/100
= 6.0 lbs/hour

b. Max Yearly = ton/yr * (100-70)/100
= 1.9 tons/year

Allowable PM emissions from Rule 326 IAC 6-3-2 for the storage handling process = $55.0 * P^{0.11} - 40$ lbs/hour

= $55.0*2420^{0.11} - 40$
= 89.6 lbs/hour
= 89.6*8760/2000 tons/year
= 392 tons/year

Potential PM emissions from the storage handling process = silo PM

= 13.2 + 12.4 tons/year
= 25.6 tons/year

State allowable PM emissions from the storage handling process for the purpose of permitting = Construction Permit PM emissions Limits - Annex only

= 1.59 tons/year
= 3.3 pounds/hour

Revision required:
State allowable PM emissions from the storage handling process for the purpose of permitting = Construction Permit PM emissions Limits - Annex + Merch House

= 5.0 tons/year
= 15.3 pounds/hour

SOYBEAN CLEANING PROCESS

Grain Cleaning P4

Grain Cleaner System

PM Emission Factor	0.075	lb/ton	(AP-42,Section 9.9.1, Grain Cleaning)
PM10 Emission Factor	0.075	lb/ton	
PM10/PM ratio	1.000		
Rate/hour	100.785	tons	
Rate/year	882,877	tons (crush capacity)	
Capture efficiency	100	%	

Potential PM emissions for soybean cleaner system = Emission factor * process rate

a. Max Hourly = (0.075 lb/ton)*(100.785 ton/hour)
= 7.6 lbs/hour

b. Max Yearly = (0.075 lb/ton)*(882,877 ton/year)/(2000 lb/ton)
= 33.1 tons/year

Potential PM10 emissions for soybean cleaner system = Emission factor * process rate

a. Max Hourly = (0.075 lb/ton)*(100.785 ton/hour)
= 7.56 lbs/hour

b. Max Yearly = (0.075 lb/ton)*(882,877 ton/year)/(2000 lb/ton)
= 33.1 tons/year

Maximum controlled PM emissions from feed conveyor, cleaner and scale system = baghouse outlet grain loading * gas flow rate

Filter	19,000	cfm	
Outlet loading	0.005	gr/cfm	11/12/98 compliance test - meal loadout: 0.0011 gr/cfm

a. Max Hourly = (0.005 gr/scf)* 19,000 cfm *60 min/hour /7000 grains/lb
= 0.814 pounds/hour

b. Max Yearly = max hourly * 8,760hrs/yr / 2000 lb/ton
3.57 tons/year

Maximum controlled PM10 emissions from feed conveyor, cleaner and scale system = baghouse outlet grain loading * gas flow rate

a. Max Hourly = (0.005 gr/scf)*19,000 cfm *60 min/hour /7000 grains/lb
= 0.814 pounds/hour

b. Max Yearly = max hourly * (8,760hrs/yr) /(2000 lb/ton)
3.57 tons/year

Allowable PM emissions from Rule 326 IAC 6-3-2 for the cleaning process = $55.0* P^{0.11} - 40$ lbs/hour

= $55.0*100.785^{0.11} - 40$
= 51.4 lbs/hour
= 51.4*8760/2000 tons/year
= 225 tons/year

Potential PM emissions from the cleaning process = conveyor PM + cleaning system PM
= 33.1 tons/year

State allowable PM emissions from the cleaning process for the purpose of permitting = Construction Permit PM emissions Limits
= 3.57 tons/year
= 0.814 pounds/hour

SOYBEAN DRYING / CRACKING / DEHULLING PROCESS

Soybean Cracking & Dehulling P5

PM Emission Factor	3.6	lb/ton	(AP-42, Section 9.11.1, Table 4.5) (Vegetable Oil Processing)
PM10 Emission Factor	2.48	lb/ton	
PM10/PM ratio	0.69		From compliance tests: maximum % of PM of filter vs total: 69%
Process rate	201,570	lb/hour	
Process rate	882,877	ton/year	

TSD APPENDIX A.1.1

Existing Permitted Facility Emissions Based on CP-129-7488 (as amended)

Potential PM emissions for soybean cracking & dehulling	=	Emission factor * process rate
a. Max Hourly	=	3.6 lb/ton * 201,570/2000 ton/hour)
	=	363 lbs/hour
b. Max Yearly	=	3.6 lb/ton * 882,877 ton/year /(2000 lb/ton)
	=	1,589 tons/year
Potential PM10 emissions for soybean cracking & dehulling	=	Emission factor * process rate
a. Max Hourly	=	Potential PM * PM10/PM factor
	=	363 * 0.69 lbs/hour
	=	250.3 lbs/hour
b. Max Yearly	=	Potential PM * PM10/PM factor
		1,589 * 0.69 tons/year
	=	1097 tons/year

Manufacturer (Crown Co.) guarantee on PM emissions from the bean heater, dryers, crackers, dehulling and hull refining is 12.4 lb/hour at 64,330 acfm at 148^{0}F, 18% relative humidity. This guarantee determines the maximum controlled PM emissions. This emission rate is guaranteed based on information available to the vendor.
Initial compliance testing conducted 11/13/98: 39,667 acfm, 6.02 lb/hr

Maximum controlled PM emissions for the soybean cracking & dehulling	=	12.4 lbs/hour
a. Max Hourly	=	12.4 lbs/hour
b. Max Yearly	=	12.4 * 8760/2000 tons/year
		54.3 tons/year
Maximum controlled PM10 emissions for the soybean cracking & dehulling	=	Potential PM * PM10/PM factor
a. Max Hourly	=	12.4 * 0.69 lbs/hour
		8.6 lbs/hour
b. Max Yearly	=	12.4 * 0.69 * 8760/2000 tons/year
		37.5 tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for the cracking & dehulling process	=	55.0* $P^{0.11}$ - 40 lbs/hour
	=	55.0*100.785$^{0.11}$ - 40
	=	51.4 lbs/hour
	=	51.4*8760/2000 tons/year
	=	225 tons/year
Potential PM emissions from the cracking & dehulling process	=	cracking & dehulling system PM
	=	54.3 tons/year

State allowable PM emissions from the cracking & dehulling process for the purpose of permitting = Construction Permit PM emissions Limits

= 54.3 tons/year
= 12.4 lbs/hour

SOYBEAN FLAKING PROCESS

Flaking Process P19

PM Emission Factor	0.37	lb/ton	(AP-42, Section 9.11.1, Table 4.5)
PM10 Emission Factor	0.23	lb/ton	(Vegetable Oil Processing)
PM10/PM ratio	0.61	0.35/0.57	from AIRS 3/90
Rate/hour	183,783	pounds	(91.176 % of scale weight)
	91.9	tons	
Rate/year	804,972	tons	
Capture efficiency	100	%	

Potential PM emissions for soybean flaking = Emission factor * process rate

a. Max Hourly = (0.37 lb/ton)*(91.9 ton/hour)
= 34.0 lbs/hour

b. Max Yearly = (0.37)*(804,972 ton/year)/(2000 lb/ton)
= 149 tons/year

Potential PM10 emissions for soybean flaking = Emission factor * process rate

a. Max Hourly = (0.37*0.61 lb/ton)*(91.9 ton/hour)
= 20.9 lbs/hour

b. Max Yearly = (0.37 *0.61 lb/ton)*(804,972 ton/year)/(2000 lb/ton)
= 91.4 tons/year

Maximum controlled PM emissions from flaking system = baghouse outlet grain loading * gas flow rate

Filter	9,000	scfm
Outlet loading	0.005	gr/scfm

a. Max Hourly = (0.005 gr/scf)* 9,000 scfm *60 min/hour /7000 grains/lb
= 0.39 pounds/hour

b. Max Yearly = max hourly * 8,760hrs/yr / 2000 lb/ton
1.69 tons/year

Maximum controlled PM10 emissions from flaking system = baghouse outlet grain loading * gas flow rate

a. Max Hourly = (0.005 gr/scf)*9,000 cfm *60 min/hour /7000 grains/lb
= 0.39 pounds/hour

b. Max Yearly = max hourly * (8,760hrs/yr) /(2000 lb/ton)
1.69 tons/year

Allowable PM emissions from Rule 326 IAC 6-3-2 for the flaking process	=	$55.0 * P^{0.11} - 40$	lbs/hour
	=	$55.0 * 91.9^{0.11} - 40$	
	=	50.4	lbs/hour
	=	50.4*8760/2000	tons/year
	=	221	tons/year
State allowable PM emissions from the flaking process for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	1.69	tons/year
	=	0.39	pounds/hour

DTDC MEAL DRYING PROCESS

DTDC Dryers P10 & 11

PM Emission Factor	1.8	lb/ton	(AP-42, Section 9.11.1, Table 4.5)
PM10 Emission Factor	1.8	lb/ton	(Vegetable Oil Processing)
PM10/PM ratio	1.00		
Rate/hour	146,237	pounds	(72.549% of scale weight)
	73.1	tons	
Rate/year	640,518	tons	
Air volume	6,751	dscfm	determined from 11/12/98 compliance test on meal cooler
PM concentration	0.0007	grains/dscf	determined from 11/12/98 compliance test on meal cooler
PM emision rate	0.041	pounds/hr	determined from 11/12/98 compliance test on meal cooler
Cyclone efficiency	99.97	%	determined from 11/12/98 compliance test on meal cooler
Cyclone efficiency	99.9	%	used for emissions calculations

Potential PM emissions for meal drying process	=	Emission factor * process rate	
a. Max Hourly	=	(1.8 lb/ton)*(73.1 ton/hour)	
	=	132	lbs/hour
b. Max Yearly	=	(1.8)*(640,518 ton/year)/(2000 lb/ton)	
	=	576	tons/year
Potential PM10 emissions for meal drying process	=	Emission factor * process rate	
a. Max Hourly	=	(1.8*0.6 lb/ton)*(73.1 ton/hour)	
	=	131.6	lbs/hour
b. Max Yearly	=	(1.8 *0.6 lb/ton)*(640,518 ton/year)/(2000 lb/ton)	
	=	576	tons/year
Maximum controlled PM emissions from meal drying process	=	Potential PM emissions * (100-cyclone efficiency)/100	
a. Max Hourly	=	(132 lb/hour) * (100-99.9)/100	
	=	0.14	pounds/hour
b. Max Yearly	=	11.8 lb/hour *8760/2000	
		0.6	tons/year

Maximum controlled PM10 emissions from meal drying process	=	Potential PM10 emissions * (100-cyclone efficiency)/100	
a. Max Hourly	=	(79 lb/hour) * (100-99.9)/100	
	=	0.043	pounds/hour
b. Max Yearly	=	max hourly * (8,760hrs/yr) /(2000 lb/ton)	
		0.2	tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for the meal drying process	=	$55.0* P^{0.11} - 40$	lbs/hour
	=	$55.0*73.1^{0.11} - 40$	
	=	48.2	lbs/hour
	=	48.2*8760/2000	tons/year
	=	211	tons/year
State allowable PM emissions from the meal drying process for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	51.9	tons/year
	=	11.8	pounds/hr

DTDC MEAL COOLING PROCESS

DTDC Cooler P12

PM Emission Factor	1.9	lb/ton	(AP-42, Section 9.11.1, Table 4.5)
PM10 Emission Factor	1.9	lb/ton	(Vegetable Oil Processing)
PM10/PM ratio	1.00		
Rate/hour	146,237	pounds	
	73.12	tons	
Rate/year	640,518	tons	
Air volume	6,751	dscfm	determined from 11/12/98 compliance test on meal cooler
PM concentration	0.0007	grains/dscf	determined from 11/12/98 compliance test on meal cooler
PM emision rate	0.041	pounds/hr	determined from 11/12/98 compliance test on meal cooler
Cyclone efficiency	99.97	%	determined from 11/12/98 compliance test on meal cooler
Cyclone efficiency	99.9	%	used for emissions calculations

Potential PM emissions for meal cooling process	=	Emission factor * process rate	
a. Max Hourly	=	(1.9 lb/ton)*(73.1 ton/hour)	
	=	139	lbs/hour
b. Max Yearly	=	(1.9)*(640,518 ton/year)/(2000 lb/ton)	
	=	608	tons/year
Potential PM10 emissions for meal cooling process	=	Emission factor * process rate	
a. Max Hourly	=	(1.9*0.611 lb/ton)*(73.1 ton/hour)	
	=	138.9	lbs/hour
b. Max Yearly	=	(1.9 *0.611 lb/ton)*(640,518 ton/year)/(2000 lb/ton)	
	=	608	tons/year

Maximum controlled PM emissions from meal cooling process	=	Potential PM emissions * (100-cyclone efficiency)/100
a. Max Hourly	=	(139 lb/hour) * (100-99.9)/100
	=	0.14 pounds/hour
b. Max Yearly	=	12.5 lb/hour *8760/2000
		0.6 tons/year
Maximum controlled PM10 emissions from meal cooling process	=	Potential PM10 emissions * (100-cyclone efficiency)/100
a. Max Hourly	=	(84.9 lb/hour) * (100-999)/100
	=	0.14 pounds/hour
b. Max Yearly	=	max hourly * (8,760hrs/yr) /(2000 lb/ton)
		0.6 tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for the meal cooling process	=	$55.0* P^{0.11} - 40$ lbs/hour
	=	$55.0*73.1^{0.11} - 40$
	=	48.2 lbs/hour
	=	48.2*8760/2000 tons/year
	=	211 tons/year
State allowable PM emissions from the meal cooling process for the purpose of permitting	=	Construction Permit PM emissions Limits
	=	54.8 tons/year
	=	12.5 pounds/hr

MEAL SIZING PROCESS

Meal Sizing P9

Emissions from the meal leg are included in the sizing emissions since both are aspirated by a common baghouse.

PM Emission Factor	3.4	lb/ton	(AP-42, Section 9.11.1, Table 4.5)
PM10 Emission Factor	2.08	lb/ton	(Vegetable Oil Processing)
PM10/PM ratio	0.611	(1.1/1.8)	from AIRS 3/90
Rate/hour	146,237	pounds	
	73.1	tons	
Rate/year	640,518	tons	
Capture efficiency	100	%	

Potential PM emissions for meal sizing	=	Emission factor * process rate
a. Max Hourly	=	(3.4 lb/ton)*(73.1 ton/hour)
	=	248.6 lbs/hour
b. Max Yearly	=	(3.4)*(640,518 ton/year)/(2000 lb/ton)
	=	1,089 tons/year

Potential PM10 emissions for meal sizing	=	Emission factor * process rate	
a. Max Hourly	=	(3.4*0.611 lb/ton)*(73.1 ton/hour)	
	=	151.9	lbs/hour
b. Max Yearly	=	(3.4 *0.611 lb/ton)*(640,518 ton/year)/(2000 lb/ton)	
	=	665	tons/year
Maximum controlled PM emissions from meal sizing	=	baghouse outlet grain loading * gas flow rate	
Filter	4,637	dscfm	detrmined from 11/10/98 compliance test
Outlet loading	0.0065	gr/scfm	determined from 11/10/98 compliance test
a. Max Hourly	=	(0.0065 gr/scf)* 4637 scfm *60 min/hour /7000 grains/lb	
	=	0.26	pounds/hour
b. Max Yearly	=	max hourly * 8,760hrs/yr / 2000 lb/ton	
		1.13	tons/year
Maximum controlled PM10 emissions from meal sizing	=	baghouse outlet grain loading * gas flow rate	
a. Max Hourly	=	(0.0065 gr/scf)*4637 cfm *60 min/hour /7000 grains/lb	
	=	0.26	pounds/hour
b. Max Yearly	=	max hourly * (8,760hrs/yr) /(2000 lb/ton)	
		1.13	tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for meal sizing	=	$55.0* P^{0.11} - 40$	lbs/hour
	=	$55.0*73.1^{0.11} - 40$	
	=	48.2	lbs/hour
	=	48.2*8760/2000	tons/year
	=	211	tons/year
State allowable PM emissions from meal sizing for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	1.13	tons/year
	=	0.26	pounds/hr

KAOLIN HANDLING PROCESS

Kaolin Bin P3

PM Emission Factor	1.4	lb/ton	(AP-42, Section 9.9.7-1, Starch Storage Bin)
PM10 Emission Factor	1.4	lb/ton	
Rate/hour	60,000	pounds	
	30	tons	
Rate/year	0.5	% of meal tons	
Meal rate	640,518	tons/year	
Filter	2,400	scfm	
Outlet loading	0.005	gr/scfm	

	=	Emission factor * process rate
Potential PM emissions for Kaolin bin		
a. Max Hourly	=	(1.4 lb/ton)*(30 ton/hour)
	=	42.0 lbs/hour
b. Max Yearly	=	(1.4)*(0.5/100)*(73.1)(8760hrs/yr)/(2000 lb/ton)
	=	2.24 tons/year
Potential PM10 emissions for Kaolin bin	=	Emission factor * process rate
a. Max Hourly	=	(1.4 lb/ton)*(30 ton/hour)
	=	42.0 lbs/hour
b. Max Yearly	=	(1.4)*(0.5/100)(640,518 ton/year)/(2000 lb/ton)
	=	2.24 tons/year
Maximum controlled PM emissions from Kaolin bin	=	baghouse outlet grain loading * gas flow rate
a. Max Hourly	=	(0.005 gr/scf)* 2,400 scfm *60 min/hour /7000 grains/lb
	=	0.103 pounds/hour
b. Max Yearly	=	(0.103)*((0.5/100)*(73.1))/30*(8760hrs/yr)/(2000 lb/ton)
		0.075 tons/year
Maximum controlled PM10 emissions from Kaolin bin	=	baghouse outlet grain loading * gas flow rate
a. Max Hourly	=	(0.005 gr/scf)* 2,400 cfm *60 min/hour /7000 grains/lb
	=	0.103 pounds/hour
b. Max Yearly	=	(1.4)*((0.5/100)*(73.1))/30*(8760hrs/yr)/(2000 lb/ton)
		0.075 tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for Kaolin bin	=	$4.10* P^{0.67}$ lbs/hour
	=	$4.10*30^{0.67}$
	=	40 lbs/hour
	=	40*8760/2000 tons/year
	=	175 tons/year
State allowable PM emissions from Kaolin bin for the purpose of permitting	=	Construction Permit PM emissions Limits
	=	0.075 tons/year
	=	0.103 pounds/hr

BARGE RECEIVING / MEAL STORAGE AND LOADOUT PROCESS

Meal storage & meal loadout P20, P14, P15 & P16
The meal conveyorsare all totally enclosed conveyors.

PM Emission Factor	0.03	lb/ton	(May '94 draft AP-42, Section 9.9.1-3)
PM10 Emission Factor	0.0044	lb/ton	
PM10/PM ratio	0.148	(.0.4/0.27)	from AIRS 3/90
Process Rate/hour	146,968	pounds	
	73.5	tons	
Loadout Rate/hour	746,968	pounds	
Rate/year	643,721	tons	
Capture efficiency	100	%	

Meal storage bins P20

Potential PM emissions for meal storage bins = Emission factor * process rate

a. Max Hourly = (0.03 lb/ton)*(73.5 ton/hour)
= 2.20 lbs/hour

b. Max Yearly = (0.03)*(643,721 ton/year)/(2000 lb/ton)
= 9.66 tons/year

Potential PM10 emissions for meal storage bins = Emission factor * process rate

a. Max Hourly = (0.03*0.148 lb/ton)*(73.5 ton/hour)
= 0.33 lbs/hour

b. Max Yearly = (0.03 *0.148 lb/ton)*(643,721 ton/year)/(2000 lb/ton)
= 1.43 tons/year

Meal loadout bins P20

Potential PM emissions for meal loadout bins = Emission factor * process rate

a. Max Hourly = (0.03 lb/ton)*(746,968/2000 ton/hour)
= 11.2 lbs/hour

b. Max Yearly = (0.03)*(643,721 ton/year)/(2000 lb/ton)
= 9.66 tons/year

Potential PM10 emissions for meal loadout bins = Emission factor * process rate

a. Max Hourly = (0.03*0.148 lb/ton)*(746,968/2000 ton/hour)
= 1.66 lbs/hour

b. Max Yearly = (0.03 *0.148 lb/ton)*(643,721 ton/year)/(2000 lb/ton)
= 1.43 tons/year

Maximum controlled PM emissions from meal storage & loadout bins = baghouse outlet grain loading * gas flow rate

Filter	6000	scfm	
Outlet loading	0.005	gr/scfm	11/12/98 compliance test - meal loadout: 0.0011 gr/cfm

a. Max Hourly = (0.005 gr/scf)* 6,000 scfm *60 min/hour /7000 grains/lb
= 0.257 pounds/hour

b. Max Yearly = max hourly * 8,760hrs/yr / 2000 lb/ton
1.13 tons/year

Maximum controlled PM10 emissions from meal storage & loadout bins = baghouse outlet grain loading * gas flow rate

a. Max Hourly = (0.005 gr/scf)*6,000 cfm *60 min/hour /7000 grains/lb
= 0.257 pounds/hour

b. Max Yearly = max hourly * (8,760hrs/yr) /(2000 lb/ton)
1.13 tons/year

Meal loadout: truck, rail, or barge P14 & P15

PM Emission Factor	0.27	lb/ton	(AP-42, Section 9.11.1, Table 4.5)
PM10 Emission Factor	0.04	lb/ton	(Vegetable Oil Processing)
PM10/PM ratio	0.148	(0.04/0.27)	
Rate/hour	746,968	pounds	
	373.5	tons	
Rate/year	643,721	tons	

Potential PM emissions for meal loadout = Emission factor * process rate

a. Max Hourly = (0.27 lb/ton)*(373.5 ton/hour)
= 101 lbs/hour

b. Max Yearly = (0.27)*(ton/year)/(2000 lb/ton)
= 86.9 tons/year

Potential PM10 emissions for meal loadout = Emission factor * process rate

a. Max Hourly = (0.27*0.148 lb/ton)*(373.5 ton/hour)
= 14.9 lbs/hour

b. Max Yearly = (0.27 *0.148 lb/ton)*(643,721 ton/year)/(2000 lb/ton)
= 12.9 tons/year

Meal truck loadout P14

Maximum controlled PM emissions from meal truck loadout = baghouse outlet grain loading * gas flow rate

Filter	16,000	scfm	
Outlet loading	0.005	gr/scfm	11/12/98 compliance test - meal loadout: 0.0011 gr/cfm

a. Max Hourly = (0.005 gr/scf)* 16,000 scfm *60 min/hour /7000 grains/lb
= 0.686 pounds/hour

b. Max Yearly = max hourly * 8,760hrs/yr / 2000 lb/ton
3.0 tons/year

Maximum controlled PM10 emissions from meal truck loadout = baghouse outlet grain loading * gas flow rate

a. Max Hourly = (0.005 gr/scf)*16,000 cfm *60 min/hour /7000 grains/lb
= 0.686 pounds/hour

b. Max Yearly = max hourly * (8,760hrs/yr) /(2000 lb/ton)
3.0 tons/year

Meal rail or barge loadout P15

Maximum controlled PM emissions from meal loadout leg & rail loadout = baghouse outlet grain loading * gas flow rate

Filter	16,000	scfm	11/12/98 compliance test - meal loadout: 17,488 dscfm
Outlet loading	0.005	gr/scfm	11/12/98 compliance test - meal loadout: 0.0011 gr/cfm

a. Max Hourly = (0.005 gr/scf)* 16,000 scfm *60 min/hour /7000 grains/lb
= 0.686 pounds/hour

b. Max Yearly = max hourly * 8,760hrs/yr / 2000 lb/ton
3.0 tons/year

Maximum controlled PM10 emissions from meal loadout leg & rail loadout = baghouse outlet grain loading * gas flow rate

a. Max Hourly = (0.005 gr/scf)*16,000 cfm *60 min/hour /7000 grains/lb
= 0.686 pounds/hour

b. Max Yearly = max hourly * (8,760hrs/yr) /(2000 lb/ton)
3.0 tons/year

Grain Barge Receiving P16

The bean barge receiving system includes: crane unloading hopper aspirated to the barge meal loadout baghouse (C16), an enclosed conveyor replacing the barge belt, an oil application system for dust control, 2 enclosed bucket elevators, and 3 enclosed belt/mass flow conveyors. The system discharges to the truck/rail receiving leg. The barge unloading emission factor of interim AP-42, Table 9.9.1-2, overestimates both potential and controlled emissions for the proposed system. An emission factor development document, PB 229-996: *Emission Control In The Grain And Feed Industry, Volume 1* , includes a section on barge unloading (copy enclosed). A statement is made that ""Dust emitted during barge and ship unloading is relatively small in quantity in comparison with railroad car or truck unloading. Also, the statement is made that "It appears that little dust was generated in the barge by the bucket elevator(s)." The proposed system uses a clamshell versus elevator legs. Legs generate more dust that a clamshell due to the churning action of the legs. Also, the emissions measured were the input to the baghouse aspirating the leg receiving hopper and the unloading system conveyor transfer points. Combining all these factors, it is estimated that potential emissions from the proposed unloading system will be 10% of the measured emissions: 0.21 lb/ton. Also, due to improvements in capture efficiency due to hood design improvements, it is estimated that the capture efficiency will be 95%.

PM Emission Factor	0.021	lb/ton
PM10 Emission Factor	0.0053	lb/ton
PM10/PM ratio	0.25	
Unloading rate/hour	540	tons
Unloading rate/year	882,877	tons
Capture efficiency	95	%

TSD APPENDIX A.1.1

Existing Permitted Facility Emissions Based on CP-129-7488 (as amended)

Potential PM emissions due to soybean unloading excluding fugitive emissions = Emission factor * process rate * Capture efficiency/100

a. Max Hourly = (0.021 lb/ton)*(540 ton/hour)*(95/100)
= 10.8 lbs/hour

b. Max Yearly = (0.021 lb/ton)*(882,877 ton/year)*(95/100)/(2000 lb/ton)
= 8.8 tons/year

Potential PM10 emissions due to soybean unloading excluding fugitive emissions = Emission factor * process rate * Capture efficiency/100

a. Max Hourly = (0.0053 lb/ton)*(540 ton/hour)*(95/100)
= 2.7 lbs/hour

b. Max Yearly = (0.0053 lb/ton)*(882,877 ton/year)*(95/100)/(2000 lb/ton)
= 2.2 tons/year

Potential Fugitive PM emissions due to soybean unloading = Emission factor * process rate * (100-Capture efficiency)/100

a. Max Hourly = (0.021 lb/ton)*(540 ton/hour)*((100-95)/100)
= 0.6 lbs/hour

b. Max Yearly = (0.021 lb/ton)*(882,877 ton/year)*((100-95)/100)/(2000 lb/ton)
= 0.5 tons/year

Potential Fugitive PM10 emissions due to soybean unloading = Emission factor * process rate * (100-Capture efficiency)/100

a. Max Hourly = (0.0053 lb/ton)*(540 ton/hour)*((100-95)/100)
= 0.14 lbs/hour

b. Max Yearly = (0.0053 lb/ton)*(882,877 ton/year)*(95/100)/(2000 lb/ton)
= 0.12 tons/year

Maximum controlled PM emissions from barge unloading = baghouse outlet grain loading * gas flow rate

Filter 16,000 scfm
Outlet loading 0.005 gr/scfm

a. Max Hourly = (0.005 gr/scf)* 16,000 scfm *60 min/hour /7000 grains/lb
= 0.686 pounds/hour

b. Max Yearly = max hourly * 8,760hrs/yr / 2000 lb/ton
3.0 tons/year

Maximum controlled PM10 emissions from barge unloading = baghouse outlet grain loading * gas flow rate

a. Max Hourly = (0.005 gr/scf)*16,000 cfm *60 min/hour /7000 grains/lb
= 0.686 pounds/hour

b. Max Yearly = max hourly * (8,760hrs/yr) /(2000 lb/ton)
3.0 tons/year

Allowable PM emissions from Rule 326 IAC 6-3-2 for the barge receiving, meal storage & meal

= $55.0 * P^{0.11} - 40$ lbs/hour

= $55.0 * 540^{0.11} - 40$
= 69.9 lbs/hour
= 69.9*8760/2000 tons/year
= 306 tons/year

Potential PM emissions from the barge receiving, meal storage & meal loadout systems

= barge + meal storage + meal loadout PM

= 10.8+0.6+9.7+9.7+86.9 tons/year
= 117.6 tons/year

State allowable PM emissions from the barge receiving, meal storage & meal loadout systems for the purpose of permitting

= Construction Permit PM emissions Limits

= 4.13 tons/year
= 2.32 lbs/hour

HULL GRINDING PROCESS

Hull grinding P6

PM Emission Factor	2	lb/ton	(AP-42, Section 9.11.1, Table 4.5)
PM10 Emission Factor	1.2	lb/ton	(Vegetable Oil Processing)
PM10/PM ratio	0.600	(1.2/2.0)	
Rate/hour	14,110	pounds	(7% of crush))
	7.05	tons	
Rate/year	61,801	tons	

Potential PM emissions for hull grinding

= Emission factor * process rate

a. Max Hourly

= (2.0 lb/ton)*(7.055 ton/hour)
= 14.1 lbs/hour

b. Max Yearly

= (2.0)*(61,801 ton/year)/(2000 lb/ton)
= 61.8 tons/year

Potential PM10 emissions for hull grinding

= Emission factor * process rate

a. Max Hourly

= (2.0*0.6 1 b/ton)*(7.055 ton/hour)
= 8.5 lbs/hour

b. Max Yearly

= (2.0 *0.6 lb/ton)*(61,801 ton/year)/(2000 lb/ton)
= 37.1 tons/year

Maximum controlled PM emissions from hull grinding

= baghouse outlet grain loading * gas flow rate

Filter	750	scfm
Outlet loading	0.005	gr/scfm

a. Max Hourly

= (0.005 gr/scf)* 750 scfm *60 min/hour /7000 grains/lb
= 0.032 pounds/hour

b. Max Yearly = max hourly * 8,760hrs/yr / 2000 lb/ton
0.14 tons/year

Maximum controlled PM10 emissions from hull grinding = baghouse outlet grain loading * gas flow rate

a. Max Hourly = (0.005 gr/scf)*750 cfm *60 min/hour /7000 grains/lb
= 0.032 pounds/hour

b. Max Yearly = max hourly * (8,760hrs/yr) /(2000 lb/ton)
0.14 tons/year

Allowable PM emissions from Rule 326 IAC 6-3-2 for hull grinding = $4.10*P^{0.67}$ lbs/hour
= $4.10*7.055^{0.67}$
= 15.2 lbs/hour
= 15.2*8760/2000 tons/year
= 66 tons/year

Allowable PM emissions from hull grinding for permitting = Construction Permit PM emissions Limits
= 0.14 tons/year
= 0.032 pounds/hour

HULL STORAGE AND HANDLING PROCESS

Hull storage bins P7 & P7A

Loading P7

PM Emission Factor	0.03	lb/ton	(May '94 draft AP-42, Section 9.9.1-3)
PM10 Emission Factor	0.015	lb/ton	
PM10/PM ratio	0.5		
Rate/hour	20,000	pounds	
	10	tons	
Rate/year	61,801	tons	
Capture efficiency	100	%	

Potential PM emissions = Emission factor * process rate

a. Max Hourly = (0.03 lb/ton)*(10 ton/hour)
= 0.30 lbs/hour

b. Max Yearly = (0.3)*(8760 hr/year)/(2000 lb/ton)
= 1.31 tons/year

Potential PM10 emissions = Emission factor * process rate

a. Max Hourly = (0.03*0.5 lb/ton)*(10 ton/hour)
= 0.15 lbs/hour

b. Max Yearly = (0.03 *0.5 lb/ton)*(8760 hr/year)/(2000 lb/ton)
= 0.7 tons/year

TSD APPENDIX A.1.1

Existing Permitted Facility Emissions Based on CP-129-7488 (as amended)

Maximum controlled PM emissions	=	baghouse outlet grain loading * gas flow rate	
Filter	4,000	scfm	
Outlet loading	0.005	gr/scfm	
a. Max Hourly	=	(0.005 gr/scf)* 4,000 scfm *60 min/hour /7000 grains/lb	
	=	0.171	pounds/hour
b. Max Yearly	=	max hourly * 8,760hrs/yr / 2000 lb/ton	
		0.75	tons/year
Maximum controlled PM10 emissions	=	baghouse outlet grain loading * gas flow rate	
a. Max Hourly	=	(0.005 gr/scf)*4,000 cfm *60 min/hour /7000 grains/lb	
	=	0.171	pounds/hour
b. Max Yearly	=	max hourly * (8,760hrs/yr) /(2000 lb/ton)	
		0.75	tons/year

Unloading P7A

PM Emission Factor	0.03	lb/ton	(May '94 draft AP-42, Section 9.9.1-3)
PM10 Emission Factor	0.015	lb/ton	
PM10/PM ratio	0.5		
Rate/hour	20,000	pounds	
	10	tons	
Rate/year	61,801	tons	
Capture efficiency	100	%	
Potential PM emissions	=	Emission factor * process rate	
a. Max Hourly	=	(0.03 lb/ton)*(10 ton/hour)	
	=	0.30	lbs/hour
b. Max Yearly	=	(0.3)*(8760 hr/year)/(2000 lb/ton)	
	=	1.31	tons/year
Potential PM10 emissions	=	Emission factor * process rate	
a. Max Hourly	=	(0.03*0.5 lb/ton)*(10 ton/hour)	
	=	0.15	lbs/hour
b. Max Yearly	=	(0.03 *0.5 lb/ton)*(8760 hr/year)/(2000 lb/ton)	
	=	0.7	tons/year
Maximum controlled PM emissions	=	baghouse outlet grain loading * gas flow rate	
Filter	4,000	scfm	
Outlet loading	0.005	gr/scfm	

a. Max Hourly = (0.005 gr/scf)* 4,000 scfm *60 min/hour /7000 grains/lb
= 0.171 pounds/hour

b. Max Yearly = max hourly * 8,760hrs/yr / 2000 lb/ton
0.75 tons/year

Maximum controlled PM10 emissions = baghouse outlet grain loading * gas flow rate

a. Max Hourly = (0.005 gr/scf)*4,000 cfm *60 min/hour /7000 grains/lb
= 0.171 pounds/hour

b. Max Yearly = max hourly * (8,760hrs/yr) /(2000 lb/ton)
0.75 tons/year

Allowable PM emissions from Rule 326 IAC 6-3-2 for hull storage bins = $4.10*P^{0.67}$ lbs/hour
= $4.10*10^{0.67}$
= 19.2 lbs/hour
= 19.2*8760/2000 tons/year
= 84 tons/year

Allowable PM emissions from hull storage bins for permitting = Construction Permit PM emissions Limits
= 1.5 tons/year
= 0.342 pounds/hour

HULL PELLET COOLING PROCESS

Hull Pellet Cooling P8

PM Emission Factor	1.0	lb/ton	(T. P. Singha engineering judgment)
PM10 Emission Factor	0.5	lb/ton	
PM10/PM ratio	0.5		
Rate/hour	30,000	pounds	
	15	tons	
Rate/year	61,801	tons	
Capture efficiency	100	%	

Potential PM emissions = Emission factor * process rate

a. Max Hourly = (1.0 lb/ton)*(15 ton/hour)
= 15 lbs/hour

b. Max Yearly = (15 lb/hr)*(8760 hr/year)/(2000 lb/ton)
= 65.7 tons/year

Potential PM10 emissions = Emission factor * process rate

a. Max Hourly = (1.0*0.5 lb/ton)*(15 ton/hour)
= 7.5 lbs/hour

b. Max Yearly = (1.0 *0.5 lb/ton)*(15 ton/hour)*(8760 hr/year)/(2000 lb/ton)
= 32.9 tons/year

Maximum controlled PM emissions = cyclone outlet grain loading * gas flow rate

Cyclone	12,000	scfm
Outlet loading	0.05	gr/scfm

a. Max Hourly = (0.05 gr/scf)* 12,000 scfm *60 min/hour /7000 grains/lb
= 5.1 pounds/hour

b. Max Yearly = max hourly * 8,760hrs/yr / 2000 lb/ton
22.5 tons/year

Maximum controlled PM10 emissions = cyclone outlet grain loading * gas flow rate

a. Max Hourly = (0.05 gr/scf)*12,000 cfm *60 min/hour /7000 grains/lb
= 5.1 pounds/hour

b. Max Yearly = max hourly * (8,760hrs/yr) /(2000 lb/ton)
22.5 tons/year

Allowable PM emissions from Rule 326 IAC 6-3-2 for hull pellet cooling = $4.10*P^{0.67}$ lbs/hour
= $4.10*15^{0.67}$
= 25.2 lbs/hour
= 25.2*8760/2000 tons/year
= 110 tons/year

State allowable PM emissions from hull pellet cooling for the purpose of permitting = Construction Permit PM emissions Limits
= 22.5 tons/year
= 5.1 pounds/hour

HULL PELLET STORAGE HANDLING PROCESS

Hull pellet storage bins P8A

PM Emission Factor	0.03	lb/ton	(May '94 draft AP-42, Section 9.9.1-3)
PM10 Emission Factor	0.015	lb/ton	
PM10/PM ratio	0.5		
Rate/hour	30,000	pounds	
	15	tons	
Rate/year	61,801	tons	
Capture efficiency	100	%	

Potential PM emissions = Emission factor * process rate

a. Max Hourly = (0.03 lb/ton)*(15 ton/hour)
= 0.45 lbs/hour

b. Max Yearly = (0.45)*(8760 hr/year)/(2000 lb/ton)
= 2.0 tons/year

Potential PM10 emissions = Emission factor * process rate

a. Max Hourly = (0.03*0.5 lb/ton)*(15 ton/hour)
= 0.23 lbs/hour

b. Max Yearly = (0.03 *0.5 lb/ton)*(15 ton/hour)*(8760 hr/year)/(2000 lb/ton)
= 1.0 tons/year

Maximum controlled PM emissions = baghouse outlet grain loading * gas flow rate

Filter	4,000	scfm
Outlet loading	0.005	gr/scfm

a. Max Hourly = (0.005 gr/scf)* 4,000 scfm *60 min/hour /7000 grains/lb
= 0.171 pounds/hour

b. Max Yearly = max hourly * 8,760hrs/yr / 2000 lb/ton
0.75 tons/year

Maximum controlled PM10 emissions	=	baghouse outlet grain loading * gas flow rate
a. Max Hourly	=	(0.005 gr/scf)*4,000 cfm *60 min/hour /7000 grains/lb
	=	0.171 pounds/hour
b. Max Yearly	=	max hourly * (8,760hrs/yr) /(2000 lb/ton)
		0.75 tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for hull pellet storage bins	=	$4.10*P^{0.67}$ lbs/hour
	=	$4.10*15^{0.67}$
	=	25.2 lbs/hour
	=	25.2*8760/2000 tons/year
	=	110 tons/year
State allowable PM emissions from hull pellet storage bins for the purpose of permitting	=	Construction Permit PM emissions Limits
	=	0.75 tons/year
	=	0.171 pounds/hour

HEATING UNITS

Boilers P17, P18 & P18A

Emission factors for natural gas combustion have been updated based on AP42, Tables 1.4-1,-2,-3, dated 03/98.

Heat input/boiler	33.659	Million BTU/hr
Number of boilers	3	
VOC emission factor	48	% of TOC factor
TOC emission factor	5.8	$lb/10^6$ cf n-gas

Unit	PM (lb/unit)	PM10 (lb/unit)	SO2 (lb/unit)	NOx (lb/unit)	VOC (lb/unit)	CO (lb/unit)
million cu. ft. burned	7.6	7.6	0.6	100	5.5	84

Potential natural gas usage	=	3*33.659 million BTU/hr * (8760 hr/year)/(1000 BTU/cu ft)
	=	884.6 Million cu ft/year

Fuel Use Mcf/yr	PM ton/year	PM10 ton/year	SO2 ton/year	NOx ton/year	VOC ton/year	CO ton/year
884.6	3.36	3.36	0.27	44.2	2.43	37.2

TSD APPENDIX A.1.1

Existing Permitted Facility Emissions Based on CP-129-7488 (as amended)

Soybean Heater P21

Process rate	201,570	lb/hr
	100.785	ton/hour
	882,877	ton/year
PM emissions	0.06	pounds per hour (Preliminary emission test - 4/3/98)
PM emissions	0.12	pounds per hour (Preliminary emission test with safety factor - 2.0)
PM10/PM factor	1.00	compliance test 11/10/98: 0.008 lb/hour

These emissions are emitted from the source without any control.

Potential PM emissions for soybean heater (soybean dryer) = 0.12 pounds per hour

a. Max Hourly = 0.12 lbs/hour

b. Max Yearly = pounds/hour * 8760 hours/year * ton/2000 pounds
= 0.53 tons/year

Potential PM10 emissions for soybean heater = Emission factor * process rate

a. Max Hourly = Potential PM * PM10/PM factor
= 0.12 lbs/hour

b. Max Yearly = Potential PM * PM10/PM factor
= 0.53 tons/year

Allowable PM emissions from Rule 326 IAC 6-3-2 for the soybean heater

= $55.0* P^{0.11} - 40$ lbs/hour

= $55.0*100.785^{0.11} - 40$
= 51.4 lbs/hour
= 51.4*8760/2000 tons/year
= 225 tons/year

Potential PM emissions from the soybean heater = 0.53 tons/year

State allowable PM emissions from the soybean heater for the purpose of permitting are included in the hot dehulling permitted emissions.

TSD APPENDIX A.1.1
Existing Permitted Facility Emissions Based on CP-129-7488 (as amended)

Grain Dryer P22 (not currently permitted - no permit requested)

Grain dryer (One)

Operation Schedule

			24	hr/day
PM Emission Factor	2.06	lbs/hr	7	days/week
PM10 Emission Factor	0.52	lbs/hr	23	weeks/yr
PM10/PM ratio	0.25	Eng. Est.		
Process rate	2,000	bu/hr @ 5 % moisture removal		
Process rate	0	ton/hr		
Process rate	0	ton/yr	(operational hours basis)	
Process rate	0	ton/yr	(8760 hours/year basis)	
Air recycle rate	23.1	%		

Potential PM emissions from grain drying

a. Max Hourly = lbs/hr Vendor warrenty: 2.06 lbs/hr

b. Max Yearly = (2.06 lb/hr)*(8,760 hrs/yr)/(2,000 lb/ton)
= 0.0 tons/yr

Potential PM10 emissions from grain drying = (PM)*(PM10/PM factor)

a. Max Hourly = (2.06 lb/hr)*(0.25)
= 0.00 lbs/hr

b. Max Yearly = (PM)*(PM10/PM factor)
= 0.0 tons/yr

Actual PM emissions from grain drying = potential emissions rate

a. Max Hourly = 0.00 lbs/hr

b. Max Yearly = (2.06 lb/hr)*(3,864 hrs/yr)/(2,000 lb/ton)
= 0.0 tons/yr

Actual PM10 emissions from grain drying = Actual PM emissions*(PM10/PM)
= 2.06 lb/hr*0.25

a. Max Hourly = 0.00 lbs/hr

b. Max Yearly = 0.0 tons/yr

Allow. PM emissions from rule 326 IAC 6-3-2 for grain drying = 55.0* P**0.11 - 40 lbs/hr
= 55.0*60**0.11 - 40 lbs/hr
= lbs/hr
= (46.3 lb/hr)*(8,760 hr/yr)/(2,000 lb/ton)
= 0 tons/yr

Actual PM emissions from grain drying = 0.0 tons/yr

Potential PM emissions from grain drying = 0.0 tons/yr

State allow. PM emiss. from grain drying for the purpose of permitting = 0.0 tons/yr

TSD APPENDIX A.1.1
Existing Permitted Facility Emissions Based on CP-129-7488 (as amended)

Elevator grain dryer

Emission factors are from AIRS

Heat input — Million BTU/hr 19.933

Unit	PM/PM10 (lb/unit)	SO2 (lb/unit)	NOx* (lb/unit)	VOC (lb/unit)	CO (lb/unit)
million cu. ft. burned	see above	0.6	140	2.8	35

Potential natural gas usage = (19.933 mm BTU/hr)*(8,760 hr/yr)/(1,000 BTU/cu ft)
= 0.0 Million cu ft/year

Fuel Use (MMcf/yr)	PM/PM10 (ton/yr)	SO2 (ton/yr)	NOx (ton/yr)	VOC (ton/yr)	CO (ton/yr)
0.0	see above	0.00	0	0.0	0.0

Actual natural gas usage = (19.933 mm BTU/hr)*(3864 hr/yr)/(1,000 BTU/cu ft)
= 0.0 Million cu ft/year

Fuel Use (MMcf/yr)	PM/PM10 (ton/yr)	SO2 (ton/yr)	NOx (ton/yr)	VOC (ton/yr)	CO (ton/yr)
0.0	see above	0.00	0.0	0.0	0.0

Summary Table

	Potential (ton/yr)	Potential (lbs/hr)	Actual (ton/yr)	Actual (lbs/hr)
PM	0.0	0.00	0.0	0.00
PM10	0.0	0.00	0.0	0.00
SO2	0.00	0.000	0.00	0.000
NOx	0	0.00	0.0	0.00
VOC	0.0	0.000	0.0	0.000
CO	0.0	0.000	0.0	0.000

TSD APPENDIX A.1.1
Existing Permitted Facility Emissions Based on CP-129-7488 (as amended)

Hexane (VOC) emissions

Permit limit for hexane disappearance (VOC use): 0.24 gal hexane /ton of crush.
1.34 lb hexane /ton
5.6 lb hexane /gallon

Process design (Not a limit)	=	2419	tons/day
	=	100.785	tons/hr
Base process limit on		365	day/yr operation
Process limit	=	882,877	tons/year
Normal operation	=	350	day/yr operation

Solvent disappearance:

Hexane inventory loss = 882,877 tons/year x 0.24 gal/ton x 5.6 lb/gal x 1 ton/2000 lb
= 593 tons/year

Soybean Oil Extraction Volatile Organic Compounds (VOC) Emissions

Hexane is lost from the extraction and desolventizing operations in soybean extraction plants in many areas. These include:

Point sources

a) Vent system gas during normal operation
b) Desolventized meal dryer 1 and 2
c) Desolventized meal cooler
d) Hexane storage tank

Fugitive emissions

e) Plant start-up / shutdowns
f) Plant upsets
g) General - equipment failures/leaks
h) Solvent samples

Bound in product/by-product

i) Desolventized flakes (meal)
j) Extracted soybean oil
k) Process wastewater

Area 1 - Main gas vent (Mineral Oil Absorber) P13

A. Normal operating conditions

			11/11/98 compliance test
Mineral Oil Absorber discharge maximum	124	ft^3/min air at 90^0F	39 cfm @ 75 F
Mineral Oil Absorber discharge normal	50	% LEL	21 % LEL
Crush/Process rate normal	100.785	ton/hr	

Inlet to absorber = (124 cfm)*(1 lb air/15 cf)*(0.54 lb hexane/0.43 lb air)*60 min/hr)
= 623 lb/hr

Outlet from absorber = (124 cfm)*(1 lb air/5 cf)*(60 min/hr)*1.2%*50%
= 8.93 lb/hr
= (2.98 lb/hr)*(8760 hr/yr) / (2000 lb/ton)
= 39.1 ton/yr

Hexane emissions during normal operation	=	Emission rate/processing rate
	=	(2.98 lb/hr)/(100.785 ton/hr)
	=	0.09 lb/ton crush
Efficiency of absorber	=	(Inlet - Outlet)/Inlet * 100%
		(623 - 2.98)/693 * 100%
		98.6 %

B. Upset Operating Conditions

Upset frequency (average)	15 times/year
Upset duration (average)	4 hours/occurrence
Air flow rate (maximum)	161 cfm
Hexane outlet concentration (maximum)	100 % LEL

Outlet from absorber (maximum)	=	(161 cfm)*(100%)*(1.2%)*(1 lb/15 cf)*(60 min/hour)
	=	7.7 lb/hr
	=	(7.7 lb/hr)*(15*4 hr/year)/(2000 lb/ton)
	=	0.23 ton/year
Hexane emissions - upset	=	Emission rate/processing rate
	=	(0.23 ton/yr)*(2000 lb/ton)/(882,877 ton/hr)
	=	0.001 lb/ton crush
Total absorber hexane emissions	=	Normal + Upset emissions
	=	39.1 + 0.23 ton/year
		39.3 ton/year
Hexane emissions during normal operation and upset conditions	=	Emission rate/processing rate
	=	(39.3 ton/yr)*(2000 lb/ton)/((100.785 ton/hr)*(8760 hr/year))
	=	0.09 lb/ton crush

Area 2 - Process Waste Water

Normal operating conditions occur at all times, no upsets.

Water flow	11,936	lb/hr	1998 measurements
Hexane content	64	ppm	10 ppm

Maximum hexane water loss	=	(11,936 lb/hr)*(64 ppm)
	=	0.76 lb/hr
Hexane water loss	=	(11,936 lb/hr)*(0.000064)*(8760 hr/yr)*(1 ton/2000 lb)
	=	3.35 ton/year
Hexane water loss	=	(0.76 lb/hr)/(100.785 ton/hr)
	=	0.008 lb/ton crush

Area 3 - Extracted Soybean Oil

Normal operating conditions occur at all times

Weight % oil in beans	18	%	1998 measurements
Hexane in finished oil	400	ppm	40 ppm

Maximum hexane lost in oil	=	$(400/10^6)$*(0.18 lb oil/lb beans)*(100.785 ton beans/hr)*(2000 lb/ton)
	=	14.5 lb/hr
	=	(14.5 lb/hr)*(8760 hr/yr)/(2000 lb/ton)
	=	63.6 ton/year
Hexane lost in oil	=	(14.5 lb/hr)/(100.785 ton crush/hr)
	=	0.14 lb/ton crush

Area 4 - Dryer One flake desolventizing P10

A. Normal operating conditions

Flakes in beans		73	% weight
Hexane in meal to dryer		400	ppm
Hexane in meal from dryer		261	ppm
Maximum hexane emissions	=	(100.785 ton/hr)*(2000 lb/ton)*(73%)*{(400 - 261) ppm/1,000,000}	
	=	20.5	lb/hr
	=	882,877 ton/year x 0.73 x (0.000400-0.000261)	
	=	89.6	ton/yr
Hexane emissions during normal operation	=	Emission rate/processing rate	
	=	(20.5 lb/hr)/(100.785 ton/hr)	
	=	0.203	lb/ton crush

B. Upset conditions

Hexane in meal to dryer		2,000	ppm
Hexane in meal from dryer		1305	ppm
Post dryer flake concentration is 2000 x 261/400 = 1305 ppm hexane.			
Maximum hexane emissions	=	(100.785 ton/hr)*(2000 lb/ton)*(73%)*(2000-1305) ppm	
	=	102.3	lb/hr
	=	(102.3 lb/hr)*(60 hour/year)/(2000 lb/ton)	
	=	3.1	ton/yr
Hexane emissions during upset conditions	=	Emission rate/processing rate	
	=	(3.1 ton/yr)*(2000 lb/tn)/(882,877 ton/yr)	
	=	0.007	lb/ton crush
Total hexane emissions	=	Emissions during normal operation + upset conditions	
	=	(89.6 + 3.1) ton/year	
	=	92.7	ton/year
Hexane emissions from Dryer 1	=	(92.7 ton/year)*(2000 lb/ton)/(822,877 ton crush/yr)	
	=	0.21	lb/ton crush

Area 5 - Dryer Two flake desolventizing P11

A. Normal operating conditions

Flakes in beans		73	% weight
Hexane in meal to dryer		261	ppm
Hexane in meal from dryer		186	ppm
Maximum hexane emissions	=	(100.785 ton/hr)*(2000 lb/ton)*(73%)*{(261-186) ppm/1,000,000}	
	=	11.0	lb/hr
	=	(882,877 ton/year)*(0.73)*(0.000261-0.000186)	
	=	48.3	ton/yr

Hexane emissions during normal operation	=	Emission rate/processing rate
	=	(11 lb/hr)/(100.785 ton/hr)
	=	0.110 lb/ton crush

B. Upset conditions

Hexane in meal to dryer	1,305	ppm
Hexane in meal from dryer	930	ppm

Post dryer flake concentration is 1305 x 186/261 = 930 ppm hexane.

Maximum hexane emissions	=	(100.785 ton/hr)*(2000 lb/ton)*(73%)*(1305-930) ppm
	=	55.2 lb/hr
	=	(55.2 lb/hr)*(60 hour/year)/(2000 lb/ton)
	=	1.7 ton/yr
Hexane emissions during upset conditions	=	Emission rate/processing rate
	=	(1.7 ton/yr)*(2000 lb/tn)/(882,877 ton/yr)
	=	0.004 lb/ton crush
Total hexane emissions	=	Emissions during normal operation + upset conditions
	=	(48.3 + 1.7) ton/year
	=	50.0 ton/year
Hexane emissions from Dryer 2	=	(50.0 ton/year)*(2000 lb/ton)/(822,877 ton crush/yr)
	=	0.113 lb/ton crush
Total dryer hexane emissions	=	(92.7 + 50.0) ton/year
	=	142.6 ton/year
Total dryer hexane emissions	=	(142.6 ton/year)*(2000lb/ton)/882,877 ton/year)
	=	0.323 lb/ton crush

Area 6 - Cooler flake desolventizing P12

A. Normal operating conditions

Flakes in beans	73	% weight	1998 compliance tests
Hexane in meal to cooler	186	ppm	1.05 lb/hour
Hexane in meal from cooler	150	ppm	

Maximum hexane emissions	=	(100.785 ton/hr)*(2000 lb/ton)*(73%)*{(186-150) ppm/1,000,000}
	=	5.3 lb/hr
	=	(882,877 ton/year)*(0.73)*(0.000186-0.000150)
	=	23.2 ton/yr
Hexane emissions during normal operation	=	Emission rate/processing rate
	=	(5.3 lb/hr)/(100.785 ton/hr)
	=	0.053 lb/ton crush

B. Upset conditions

Hexane in meal to cooler	930	ppm
Hexane in meal from cooler	750	ppm

Post dryer flake concentration is 930 x 150/186 = 750 ppm hexane.

Maximum hexane emissions	=	(100.785 ton/hr)*(2000 lb/ton)*(73%)*(930-750) ppm
	=	26.5 lb/hr
	=	(26.5 lb/hr)*(60 hour/year)/(2000 lb/ton)
	=	0.79 ton/yr
Hexane emissions during upset conditions	=	Emission rate/processing rate
	=	(1.7 ton/yr)*(2000 lb/tn)/(882,877 ton/yr)
	=	0.002 lb/ton crush
Total hexane emissions	=	Emissions during normal operation + upset conditions
	=	(23.2 + 0.79) ton/year
	=	24.0 ton/year
Hexane emissions from cooler	=	(24.0 ton/year)*(2000 lb/ton)/(822,877 ton crush/yr)
	=	0.054 lb/ton crush

Area 7 - Hexane Remaining in meal (flakes)

A. Normal operating conditions

Flakes in beans	73	% weight
Hexane in meal	150	ppm
Maximum hexane in meal	=	(100.785 ton/hr)*(2000 lb/ton)*(73%)*(150 ppm)/(1,000,000}
	=	22.1 lb/hr
	=	(882,877 ton/year)*(0.73)*(0.000150)
	=	96.7 ton/yr
Hexane in meal during normal operation	=	Content/processing rate
	=	(22.1 lb/hr)/(100.785 ton/hr)
	=	0.22 lb/ton crush

B. Upset conditions

Hexane in meal to cooler	750	ppm
Maximum hexane in meal	=	(100.785 ton/hr)*(2000 lb/ton)*(73%)*(750 ppm)
	=	110.4 lb/hr
	=	(110.4 lb/hr)*(60 hour/year)/(2000 lb/ton)
	=	3.31 ton/yr
Hexane in meal during upset conditions	=	Emission rate/processing rate
	=	(3.31 ton/yr)*(2000 lb/tn)/(882,877 ton/yr)
	=	0.008 lb/ton crush
Total hexane in meal	=	Hexane in meal during normal operation + upset conditions
	=	(96.7 + 3.31) ton/year
	=	100.0 ton/year
Hexane in meal	=	(100.0 ton/year)*(2000 lb/ton)/(822,877 ton crush/yr)
	=	0.23 lb/ton crush

Area 8 - Start-up/Shutdowns

Start-up/Shutdown Conditions (Fugitive losses)

Startup solvent loss	11,200	lbs	or	2,000	gal
Shutdown solvent loss	11,200	lbs	or	2,000	gal
Hexane density	5.6	lb/gal			
Total loss for 1 startup/shutdown	22,400	lbs	or	4,000	gal
Duration of startup	2	hrs			
Duration of shutdown	2	hrs			
Duration for 1 startup/shutdown	4	hrs			
Frequency of startup/shutdown	4	times/year			
Total duration	16	hrs/year			

Maximum hexane emissions = (22,400 lb/occ.)/(4 hr/occ.)
= 5,600 lbs/hr

Total Hexane emissions = (5,600 lb/hr)*(16 hr/yr)/(2000 lb/ton)
= 44.8 ton/year

Hexane emissions = (44.8 ton/year)*(2000 lb/ton)/(882,877 ton crush/year)
= 0.101 lb/ton crush

Area 9 - Plant Upsets

Upset conditions (Fugitive losses)

When the process system is under pressure assume hexane loss to the atmosphere
is equal to the volume of air normally pulled into the system.

Duration	4	hrs
Frequency	15	times/year
Total duration	60	hrs/year

Flow of air in the flakes = (100.785 ton/hour)*(73%/100)*(2000 lb/ton)*(1 hour/60 min)*(1 cf/60 lb)
= 41 cfm

The volume of hexane lost will be equal to the air drawn into the system during normal operations.

Hexane loss = 124 ft^3/min - 41 ft^3/min
= 83 cfm

Maximum hexane emissions = (83 cfm)*(60 min/hr)*(1 lb/15 cf)*(4 hour/occ)*(15 occ/yr)*(1 ton/2000 lb)
= 10.0 ton/yr

Hexane emissions due to upsets = (10.0 ton/year)*(2000 lb/ton)/(882,877 ton crush/yr)
= 0.02 lb/ton crush

Area 10 - General Leaks and Equipment Failures (fugitive emissions)

Various potential sources of leaks exist throughout the plant.

Annual leak average 0.5 lb/ton crush (by experience)
It occurs throughout the year.
No identifiable conditions.

Average hexane emissions = (0.5 lb/ton)*(100.785 ton/hr)
= 50.4 lb/hr

Annual total hexane emissions = (50.4 lb/hr)*(8760 hr/yr)/(2000 lb/ton)
= 220.7 ton/yr

Area 11 - Sampling (fugitive losses)

A small amount of hexane is lost with sampling and unloading of purchased hexane.

Sampling frequency	24	samples/day (during normal operation)
Sample volume	0.1	gallon
Sample content	90	% hexane

Hexane emissions = (24 samples/day)*(365 day/year)*(0.1 gal/sample)*(5.6 lb/gal)*(90%/100)*(1 ton/2000 lb)
= 2.2 ton/yr

Annual total hexane emissions = (2.2 ton/year)*(2000 lb/ton)/(882,877 ton crush/yr)
= 0.005 lb/ton crush

Area 12 - Hexane vapors remaining in delivery truck after unloading

Hexane loss = (Amount of truck volume emptied)*(lb hexane/lb vapor)*(density of vapor)
= (593 tn/yr)*(2000 lb/tn)*(gal/5.6 lb)*(1 cf/7.48 gal)*(1 lb/15 cf air)*(0.54 lb hexane/0.43 lb air vapor)*(1 ton/2000 lb)
= 1.19 ton/yr

Annual total hexane emissions = (1.19 ton/year)*(2000 lb/ton)/(882,877 ton crush/yr)
= 0.003 lb/ton crush

Area 13 - Hexane vented from storage tank

Hexane storage is always vented to the mineral absorption system.
Therefore, no tank venting of breathing or working losses to the atmosphere occur.

Hexane loss = 0.0 ton/yr
= 0.0 lb/ton crush

TSD APPENDIX A.1.1

Existing Permitted Facility Emissions Based on CP-129-7488 (as amended)

Hexane Loss Breakdown (ton/year)

Type of Disappearance	Disappearance Normal Operations (ton/year)	Disappearance Upset Conditions (ton/year)	Disappearance Normal +Upset (ton/year)
Air Emissions-Point Sources			
Vent system (mineral oil absorber)	39.1	0.2	39.3
Desolventized meal dryer 1	89.6	3.1	92.7
Desolventized meal dryer 2	48.3	1.7	50.0
Desolventized meal cooler	23.2	0.8	24.0
Subtotal	200.2	5.7	206.0
Air Emissions-Fugitive			
Start-ups / shutdowns		44.8	44.8
Plant upsets		10.0	10.0
Sampling/hexane unloading	3.4		3.4
General	220.7		220.7
Subtotal	224.1	54.8	278.9
Products & byproducts			
Oil	63.6		63.6
Meal	96.7	3.31	100.0
Waste water	3.35		3.3
Subtotal	163.6	3.3	166.9
Total	587.9	63.8	651.8

TSD APPENDIX A.1.1

Existing Permitted Facility Emissions Based on CP-129-7488 (as amended)

Hexane Loss Breakdown (lb/ton)

Type of Disappearance	Disappearance Normal Operations (lb/ton)	Disappearance Upset Conditions (lb/ton)	Disappearance Normal +Upset (lb/ton)
Air Emissions-Point Sources			
Vent system (mineral oil absorber)	0.09	0.001	0.09
Desolventized meal dryer 1	0.20	0.007	0.21
Desolventized meal dryer 2	0.11	0.004	0.11
Desolventized meal cooler	0.05	0.002	0.05
Subtotal	0.45	0.01	0.47
Air Emissions-Fugitive			
Start-ups / shutdowns		0.10	0.1
Plant upsets		0.02	0.02
Sampling/hexane unloading	0.01		0.01
General	0.5		0.5
Subtotal	0.51	0.12	0.63
Products & byproducts			
Oil	0.14		0.14
Meal	0.22	0.01	0.23
Waste water	0.01		0.01
Subtotal	0.37	0.01	0.38
Total	1.33	0.14	1.48

TSD APPENDIX A.1.2

Summary of Facility Emissions Prior to Proposed Modification

POINT SOURCE SUMMARY TABLE **CGB, Mt Vernon, Indiana** 16-Aug-99

Source name	Source #	PM Potential (Tons/Yr)	PM Controlled (Tons/Yr)	PM10 Potential (Tons/Yr)	PM10 Controlled (Tons/Yr)	NOx (Tons/Yr)	SOx (Tons/Yr)	CO (Tons/Yr)	VOC (Tons/Yr)	HAP's (Tons/Yr)
TRUCK/RAIL RECEIVING	1 & 2	75.5	8.6	24.7	3.8	0.00	0.00	0.00	0.00	0.00
SOYBEAN STORAGE HANDLING	2A	25.6	5.0	12.8	2.5	0.00	0.00	0.00	0.00	0.00
KAOLIN HANDLING	3	2.2	0.075	2.2	0.075	0.00	0.00	0.00	0.00	0.00
SOYBEAN CLEANING	4	33.1	3.57	33.1	3.57	0.00	0.00	0.00	0.00	0.00
SOYBEANCRACKING/DEHULLING	5	1,589	54.3	1,097	37.5	0.00	0.00	0.00	0.00	0.00
HULL GRINDING	6	61.8	0.14	37.1	0.14	0.00	0.00	0.00	0.00	0.00
HULL STORAGE LOADING	7	1.3	0.75	0.7	0.75	0.00	0.00	0.00	0.00	0.00
HULL STORAGE UNLOADING	7	1.3	0.75	0.7	0.75	0.00	0.00	0.00	0.00	0.00
HULL PELLET COOLING	8	65.7	22.5	32.9	22.5	0.00	0.00	0.00	0.00	0.00
HULL PELLET STORAGE	8	2.0	0.75	1.0	0.75	0.00	0.00	0.00	0.00	0.00
MEAL SIZING	9	1,089	1.13	665	1.13	0.00	0.00	0.00	0.00	0.00
DTDC MEAL DRYING	10 & 11	576	51.9	576	51.9	0.00	0.00	0.00	142.6	142.6
DTDC MEAL COOLING	12	608	54.8	608	54.8	0.00	0.00	0.00	24.0	24.0
MINERAL OIL ABSORBER	13	0.0	0.0	0.0	0.0	0.00	0.00	0.00	39.3	39.3
TRUCK MEAL LOADOUT	14	86.9	3.0	12.9	3.0	0.00	0.00	0.00	0.00	0.00
BARGE/RAIL MEAL LOADOUT	15	0.0	3.0	0.0	3.0	0.00	0.00	0.00	0.00	0.00
BARGE GRAIN RECEIVING	16	8.8	3.0	2.2	3.0	0.00	0.00	0.00	0.00	0.00
BOILER 1	17	1.1	1.1	1.1	1.1	14.7	0.09	12.4	0.81	0.00
BOILER 2	18	1.1	1.1	1.1	1.1	14.7	0.09	12.4	0.81	0.00
BOILER 3	18	1.1	1.1	1.1	1.1	14.7	0.09	12.4	0.81	0.00
SOYBEAN FLAKING	19	148.9	1.69	91.4	1.69	0.00	0.00	0.00	0.00	0.00
MEAL STORAGE & LOADOUT BINS	20	19.3	1.13	2.9	1.13	0.00	0.00	0.00	0.00	0.00
SOYBEAN HEATER	21	0.5	0.0	0.5	0.0	0.00	0.00	0.00	0.00	0.00
TOTAL Source Emissions:		4,399.4	219.6	3,205.3	195.4	44.2	0.27	37.2	208.4	206.0

TSD APPENDIX A.1.2

Summary of Facility Emissions Prior to Proposed Modification

FUGITIVE EMISSIONS SUMMARY TABLE

Source name (Fugitive Emissions)	PM (Tons/Yr)	PM10 (Tons/Yr)	HAP's (Tons/Yr)
TRUCK/RAIL RECEIVING	19.4	4.7	0.00
SOYBEAN STORAGE HANDLING	0.0	0.0	0.00
BARGE GRAIN RECEIVING	0.5	0.1	0.00
EXTRACTION STARTUP/SHUTDOWN	0.0	0.0	44.8
EXTRACTION UPSETS	0.0	0.0	10.0
EXTRACTION SAMPLING/HEXANE UNLOAD	0.0	0.0	3.4
EXTRACTION GENERAL LOSSES	0.0	0.0	220.7
VEHICLE TRAFFIC	0.8	0.2	0.00
TOTAL Fugitive Emissions:	20.7	5.0	278.9

SOLVENT INVENTORY LOSS	HAP's
Products & Byproducts	(Tons/Yr)
Oil	63.6
Meal	100.0
Waste Water	3.3
Products & Byproducts	166.9

CG&B **Emissions Estimate** April 2000

Note: The allowable emissions of each process unit as described below are accepted by the source to enable the

TRUCK ONLY / RAIL RECEIVING PROCESS

Truck Only Receiving P1

PM Emission Factor	0.18	lb/ton	(Table 9.9.1-1, Straight Truck Receiving AP-42, 5/98)
PM10 Emission Factor	0.059	lb/ton	
PM10/PM ratio	0.328		
Unloading rate/hour	600	tons	
Unloading rate/year	940,240	tons (crush capacity)	
Capture efficiency	95	%	

Potential PM emissions due to soybean unloading, excluding fugitives = Emission factor * process rate* capture effy/100

a. Max Hourly = (lb/ton)*(unload rate ton/hour)*(capture effy/100)
= 102.6 lbs/hour

b. Max Yearly = (lb/ton)*(unload rate ton/year)/(2000 lb/ton)*(capture effy/100)
= 80.4 tons/year

Potential PM10 emissions due to soybean unloading, excluding fugitives = Emission factor * process rate*(capture eff/100)

a. Max Hourly = (lb/ton)*(unload rate ton/hour)*(capture eff/100)
= 33.6 lbs/hour

b. Max Yearly = (lb/ton)*(unload rate ton/year/(2000 lb/ton)*(capture effy/100)
= 26.4 tons/year

Potential fugitive PM emissions due to soybean unloading = Emission factor * process rate * (100-Capture efficiency)/100

a. Max Hourly = (lb/ton)*(unload rate ton/hour)*((100-eff'y)/100)
= 5.4 lbs/hour

b. Max Yearly = (lb/ton)*(unload rate ton/year)*((100-eff'y)/100)/(2000 lb/ton)
= 4.2 tons/year

Potential fugitive PM10 emissions due to soybean unloading = Emission factor * process rate * (100-Capture efficiency)/100

a. Max Hourly = (lb/ton)*(unload rate ton/hour)*((100-eff'y)/100)
= 1.8 lbs/hour

b. Max Yearly = (lb/ton)*(unload rate ton/year)*((100-eff'y/100))/(2000 lb/ton)
= 1.4 tons/year

Maximum controlled PM emissions from truck only receiving and receiving legs filter (C-1) = baghouse outlet grain loading * gas flow rate

Truck only filter	13,000	cfm	
Outlet loading	0.005	gr/cfm	11/11/98 compliance test: 0.000365 gr/cfm
PM10/PM Ratio	1		

a. Max Hourly = (outlet loading gr/scf)*(air flow cfm)*(60 min/hour)/(7000 grains/lb)
= 0.56 pounds/hour

b. Max Yearly = max hourly* 8,760 hrs/yr / 2000 lb/ton
2.44 tons/year

Maximum controlled PM10 emissions from truck only receiving and receiving legs filter (C-1)	=	baghouse outlet grain loading * gas flow rate	
a. Max Hourly	=	(outlet loading gr/scf)*(air flow cfm)*(60 min/hour)/(7000 grains/lb)	
	=	0.56	pounds/hour
b. Max Yearly	=	max hourly* (8,760hrs/yr) /(2000 lb/ton)	
		2.44	tons/year

Rail/H.B.Truck Receiving P2
(choke unloading only - railcar and H.B. truck)

PM Emission Factor	0.035	lb/ton	(Table 9.9.1-1, Truck Receiving AP-42, 5/98)
PM10 Emission Factor	0.0078	lb/ton	
PM10/PM ratio	0.223		
Unloading rate/hour	540	tons	
Unloading rate/year	940,240	tons	
Capture efficiency	60	% due to shed enclosure	

Potential PM emissions due to soybean unloading	=	Emission factor * process rate	
a. Max Hourly	=	(lb/ton)*(unload rate ton/hour)	
	=	18.9	lbs/hour
b. Max Yearly	=	(lb/ton)*(unload rate ton/year)/(2000 lb/ton)	
	=	16.5	tons/year
Potential PM10 emissions due to soybean unloading	=	Emission factor * process rate	
a. Max Hourly	=	(lb/ton)*(unload rate ton/hour)	
	=	4.2	lbs/hour
b. Max Yearly	=	(lb/ton)*(unload rate ton/year)/(2000 lb/ton)	
	=	3.7	tons/year
Maximum controlled PM emissions due to soybean unloading	=	Emission factor * process rate * (100-Capture efficiency)/100	
a. Max Hourly	=	(lb/ton)*(unload rate ton/hour)*((100-eff.)/100)	
	=	7.6	lbs/hour
b. Max Yearly	=	(lb/ton)*(unload rate ton/year)*((100-eff.)/100)/(2000 lb/ton)	
	=	6.6	tons/year
Maximum controlled PM10 emissions due to soybean unloading	=	Emission factor * process rate * (100-Capture efficiency)/100	
a. Max Hourly	=	(lb/ton)*(unload rate ton/hour)*((100-eff'y)/100)	
	=	1.7	lbs/hour
b. Max Yearly	=	(lb/ton)*(unload rate ton/year)*((100-eff'y)/100)/(2000 lb/ton)	
	=	1.5	tons/year

North Truck Only Receiving P24

PM Emission Factor	0.18	lb/ton	(Table 9.9.1-1, Straight Truck Receiving AP-42, 5/98)
PM10 Emission Factor	0.059	lb/ton	
PM10/PM ratio	0.328		
Unloading rate/hour	360	tons	
Unloading rate/year	108,000	tons	
Capture efficiency	95	%	

Bushel/hour	12000	
Beans	3,600,000	bushels
Corn/Wheat	-	bushels
Total	3,600,000	bushels

Note: Corn and Wheat bushels are a

Potential PM emissions due to soybean unloading, excluding fugitives = Emission factor * process rate* capture effy/100

a. Max Hourly = (lb/ton)*(unload rate ton/hour)*(capture eff./100)
= 64.8 lbs/hour

b. Max Yearly = (lb/ton)*(unload rate ton/year)/(2000 lb/ton)*(capture eff./100)
= 9.7 tons/year

Potential PM10 emissions due to soybean unloading, excluding fugitives = Emission factor * process rate*(capture eff/100)

a. Max Hourly = (lb/ton)*(unload rate ton/hour)*(capture eff/100)
= 21.2 lbs/hour

b. Max Yearly = (lb/ton)*(unload rate ton/year/(2000 lb/ton)*(capture effy/100)
= 3.2 tons/year

Potential fugitive PM emissions due to soybean unloading = Emission factor * process rate * (100-Capture efficiency)/100

a. Max Hourly = (lb/ton)*(unload rate ton/hour)*((100-eff'.)/100)
= 3.2 lbs/hour

b. Max Yearly = (lb/ton)*(unload rate ton/year)*((100-eff'.)/100)/(2000 lb/ton)
= 0.5 tons/year

Potential fugitive PM10 emissions due to soybean unloading = Emission factor * process rate * (100-Capture efficiency)/100

a. Max Hourly = (lb/ton)*(unload rate ton/hour)*((100-eff'.)/100)
= 1.1 lbs/hour

b. Max Yearly = (lb/ton)*(unload rate ton/year)*((100-eff'./100))/(2000 lb/ton)
= 0.2 tons/year

Maximum controlled PM emissions from truck only receiving filter (C-24) = baghouse outlet grain loading * gas flow rate

Truck only filter	10,000	cfm	
Outlet loading	0.005	gr/scf	11/11/98 compliance test on similar source: 0.000365 gr/scf
PM10/PM Ratio	1		

a. Max Hourly = (outlet loading gr/scf)*(air flow cfm)*(60 min/hour)/(7000 grains/lb)
= 0.43 pounds/hour

b. Max Yearly = max hourly* 8,760 hrs/yr / 2000 lb/ton
1.88 tons/year

Maximum controlled PM10 emissions from north truck receiving filter = baghouse outlet grain loading * gas flow rate

a. Max Hourly = (outlet loading gr/scf)*(air flow cfm)*(60 min/hour)/(7000 grains/lb)
= 0.43 pounds/hour

b. Max Yearly = max hourly* (8,760hrs/yr) /(2000 lb/ton)
1.88 tons/year

Allowable PM emissions from Rule 326 IAC 6-3-2 for all truck/rail receiving process	=	$55.0 * P^{0.11} - 40$	lbs/hour
	=	$55.0 * (\text{all truck/rail receiving})^{0.11} - 40$	
	=	83.0	lbs/hour
	=	lb/hr*(hr/yr)/(lb/ton)	
	=	363	tons/year

Requested:

State allowable PM emissions from the truck only receiving (P1) process for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	2.44	tons/year
	=	0.56	pounds /hour

PM emission limit basis #1: The process rate is limited by annual throughput (source-accepted permit limit) and the rated
The emissions estimate basis would be modified from these presumptions (with requisite request

Requested:

State allowable PM emissions from the rail/H.B. truck (P2) receiving process for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	6.6	tons/year
	=	7.6	pounds /hour

PM emission limit basis #2: Hourly emission estimates are based on the maximum hourly equipment capacity, the accepted

Requested:

State allowable PM emissions from the north truck receiving (P24) process for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	1.88	tons/year
	=	0.43	pounds /hour

PM emission limit basis: Same as PM emission basis #1.

Grain Barge Receiving P16

The bean barge receiving system includes: crane unloading hopper aspirated to the barge meal loadout baghouse (C16), an enclosed conveyor replacing the barge belt, an oil application system for dust control, 2 enclosed bucket elevators, and 3 enclosed belt/mass flow conveyors. The system discharges to the truck/rail receiving leg. The barge unloading emission factor of interim AP-42, Table 9.9.1-2, overestimates both potential and controlled emissions for the proposed system. An emission factor development document, PB 229-996: *Emission Control In The Grain And Feed Industry, Volume 1* , includes a section on barge unloading (copy enclosed). A statement is made that ""Dust emitted during barge and ship unloading is relatively small in quantity in comparison with railroad car or truck unloading. Also, the statement is made that "It appears that little dust was generated in the barge by the bucket elevator(s)." The proposed system uses a clamshell versus elevator legs. Legs generate more dust that a clamshell due to the churning action of the legs. Also, the emissions measured were the input to the baghouse aspirating the leg receiving hopper and the unloading system conveyor transfer points. Combining all these factors, it is estimated that potential emissions from the proposed unloading system will be 10% of the measured emissions: 0.21 lb/ton. Also, due to improvements in capture efficiency due to hood design improvements, it is estimated that the capture efficiency will be 95%.

PM Emission Factor	0.021	lb/ton
PM10 Emission Factor	0.0053	lb/ton
PM10/PM ratio	0.25	
Unloading rate/hour	600	tons
Unloading rate/year	940,240	tons
Capture efficiency	95	%

= Emission factor * process rate * Capture efficiency/100

Potential PM emissions due to soybean unloading excluding fugitive emissions

a. Max Hourly = (lb/ton)*(rate ton/hour)*(effy/100)
= 12.0 lbs/hour

b. Max Yearly = (lb/ton)*(rate ton/year)*(effy/100)/(2000 lb/ton)
= 9.4 tons/year

Potential PM10 emissions due to soybean unloading excluding fugitive emissions = Emission factor * process rate * Capture efficiency/100

a. Max Hourly = (lb/ton)*(rate ton/hour)*(effy/100)
= 3.0 lbs/hour

b. Max Yearly = (lb/ton)*(rate ton/year)*(effy/100)/(2000 lb/ton)
= 2.3 tons/year

Potential Fugitive PM emissions due to soybean unloading = Emission factor * process rate * (100-Capture efficiency)/100

a. Max Hourly = (lb/ton)*(rate ton/hour)*((100-effy)/100)
= 0.6 lbs/hour

b. Max Yearly = (lb/ton)*(rate ton/year)*((100-effy)/100)/(2000 lb/ton)
= 0.5 tons/year

Potential Fugitive PM10 emissions due to soybean unloading = Emission factor * process rate * (100-Capture efficiency)/100

a. Max Hourly = (lb/ton)*(rate ton/hour)*((100-effy)/100)
= 0.16 lbs/hour

b. Max Yearly = (lb/ton)*(rate ton/year)*(effy/100)/(2000 lb/ton)
= 0.12 tons/year

Maximum controlled PM emissions from barge unloading	=	baghouse outlet grain loading * gas flow rate	
Filter	16,000	scfm	
Outlet loading	0.005	gr/scfm	
a. Max Hourly	=	(0.005 gr/scf)* 16,000 scfm *60 min/hour /7000 grains/lb	
	=	0.7	pounds/hour
b. Max Yearly	=	max hourly * 8,760hrs/yr / 2000 lb/ton	
		3.0	tons/year
Maximum controlled PM10 emissions from barge unloading	=	baghouse outlet grain loading * gas flow rate	
a. Max Hourly	=	(0.005 gr/scf)*16,000 cfm *60 min/hour /7000 grains/lb	
	=	0.7	pounds/hour
b. Max Yearly	=	max hourly * (8,760hrs/yr) /(2000 lb/ton)	
		3.0	tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for the barge receiving system	=	$55.0* P^{0.11} - 40$	lbs/hour
	=	55.0*(upload rate ton/hr)$^{0.11}$ - 40	
	=	71.2	lbs/hour
	=	312	tons/year
Potential PM emissions from the barge receiving systems	=	barge receiving PM	
	=	9.4	tons/year
Requested:			
State allowable PM emissions from the barge receiving system for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	3.00	tons/year
	=	0.69	lbs/hour

PM emission limit basis: Same as PM emission basis #1.

SOYBEAN STORAGE HANDLING PROCESS

Note: All handling equipment is totally enclosed. Therefore, potential emissions from the same are zero.

Soybean Grain Storage Silos / Bins

Silo loading - ANNEX (P2A):

PM Emission Factor	0.03	lb/ton	(Table 9.9.1-3, Scale bin vent, Draft AP-42, May 1994)
PM10 Emission Factor	0.015	lb/ton	
PM10/PM ratio	0.5		
Loading rate/hour	1140	tons	
Loading rate/year	940,240	tons	
Mineral oil control efficiency	90	%	(Mineral oil + settling chamber effect of silo)

Potential PM emissions due to soybean bin loading	=	Emission factor * process rate	
a. Max Hourly	=	(lb/ton)*(load rate ton/hour)	
	=	34.2	lbs/hour
b. Max Yearly	=	(lb/ton)*(ton/year)/(2000 lb/ton)	
	=	14.1	tons/year

Potential PM10 emissions due to soybean bin loading = Potential PM Emissions * PM10/PM ratio

a. Max Hourly = max hrly lb/hour * PM10/PM ratio
= 17.1 lbs/hour

b. Max Yearly = max yrly ton/yr * PM10/PM ratio
= 7.05 tons/year

Maximum controlled PM emissions from storage bin loading = Potential PM emissions * (100 - control efficiency)/100

a. Max Hourly = lb/hr * (100-effy)/100
= 3.4 lbs/hour

b. Max Yearly = ton/yr * (100-effy)/100
= 1.4 tons/year

Maximum controlled PM10 emissions from storage bin loading = Potential PM10 emissions * (100- mineral oil control efficiency)/100

a. Max Hourly = lb/hr * (100-effy)/100
= 1.71 lbs/hour

b. Max Yearly = ton/yr * (100-effy)/100
= 0.7 tons/year

Silo loading (P26) - MERCHANDIZING HOUSE:

PM Emission Factor	0.03	lb/ton	(Table 9.9.1-3, Scale bin vent, Draft AP-42, May 1994)	
PM10 Emission Factor	0.015	lb/ton		
PM10/PM ratio	0.5			
Loading rate/hour	1340	tons - maximum		
Loading rate/year	141,036	tons	Max. % of crush:	15.0%
Settling chamber effect of silo	70	%		

Potential PM emissions due to soybean bin loading = Emission factor * process rate

a. Max Hourly = (lb/ton)*(ton/hour)
= 40.2 lbs/hour

b. Max Yearly = (lb/ton)*(ton/year)/(2000 lb/ton)
= 2.1 tons/year

Potential PM10 emissions due to soybean bin loading = Potential PM Emissions * PM10/PM ratio

a. Max Hourly = lb/hour * PM10/PM ratio
= 20.1 lbs/hour

b. Max Yearly = ton/yr * PM10/PM ratio
= 1.06 tons/year

Maximum controlled PM emissions from storage bin loading	=	Potential PM emissions * (100 - control efficiency)/100
a. Max Hourly	=	lb/hr * (100-effy)/100
	=	12.1 lbs/hour
b. Max Yearly	=	ton/yr * (100-effy)/100
	=	0.6 tons/year
Maximum controlled PM10 emissions from storage bin loading	=	Potential PM10 emissions * (100- control efficiency)/100
a. Max Hourly	=	lb/hr * (100-effy)/100
	=	6.0 lbs/hour
b. Max Yearly	=	ton/yr * (100-effy)/100
	=	0.3 tons/year

Bin loading - NORTH HOUSE (P27):

PM Emission Factor	0.03	lb/ton	(Table 9.9.1-3, Scale bin vent, Draft AP-42, May 1994)
PM10 Emission Factor	0.015	lb/ton	
PM10/PM ratio	0.5		
Loading rate/hour	360	tons - maximum	
Loading rate/year	108,000	tons	
Settling chamber effect of silo	70	%	

Potential PM emissions due to soybean bin loading	=	Emission factor * process rate
a. Max Hourly	=	(lb/ton)*(ton/hour)
	=	10.8 lbs/hour
b. Max Yearly	=	(lb/ton)*(ton/year)/(2000 lb/ton)
	=	1.6 tons/year
Potential PM10 emissions due to soybean bin loading	=	Potential PM Emissions * PM10/PM ratio
a. Max Hourly	=	lb/hour * PM10/PM ratio
	=	5.4 lbs/hour
b. Max Yearly	=	ton/yr * PM10/PM ratio
	=	0.81 tons/year
Maximum controlled PM emissions from storage bin loading	=	Potential PM emissions * (100 - control efficiency)/100
a. Max Hourly	=	lb/hr * (100-effy)/100
	=	3.2 lbs/hour
b. Max Yearly	=	ton/yr * (100-effy)/100
	=	0.5 tons/year

Maximum controlled PM10 emissions from storage bin loading	=	Potential PM10 emissions * (100- control efficiency)/100	
a. Max Hourly	=	lb/hr * (100-effy)/100	
	=	1.6	lbs/hour
b. Max Yearly	=	ton/yr * (100-effy)/100	
	=	0.2	tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for all storage handling process	=	$55.0 * P^{0.11} - 40$	lbs/hour
	=	$55.0*(\text{all storage loading})^{0.11} - 40$	
	=	91.9	lbs/hour
	=	lb/hr*(hr/yr)/(lb/ton)	
	=	402	tons/year
Requested: State allowable PM emissions from the annex storage handling process for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	1.4	tons/year
	=	3.4	pounds/hour
	PM emission limit basis:	Same as PM emission basis #2. **Limit will be 0.003 lb/ton bean handled, equivalent to 1.4 TPY PM based on production limit**.	
Requested: State allowable PM emissions from the merchandizing storage handling process for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	0.6	tons/year
	=	12.1	pounds/hour
	PM emission limit basis:	Same as PM emission basis #2. **Limit will be 0.009 lb/ton bean handled, equivalent to 4.2 TPY PM based on production limit**.	
Requested: State allowable PM emissions from the north storage handling process for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	0.5	tons/year
	=	3.2	pounds/hour
	PM emission limit basis:	Same as PM emission basis #2. **Limit will be 0.009 lb/ton bean handled, equivalent to 4.2 TPY PM based on production limit**.	

Bin loadout - NORTH HOUSE (P25):

PM Emission Factor	0.086	lb/ton	(Table 9.9.1-1, Truck grain shipping, AP-42, May 1998)
PM10 Emission Factor	0.029	lb/ton	
PM10/PM ratio	0.34		
Unloading rate/hour	360	tons - maximum	
Unloading rate/year	108,000	tons	
Choke loadout & oil application	90	%	

Potential PM emissions due to soybean loadout	=	Emission factor * process rate	
a. Max Hourly	=	(lb/ton)*(ton/hour)	
	=	31.0	lbs/hour
b. Max Yearly	=	(lb/ton)*(ton/year)/(2000 lb/ton)	
	=	4.6	tons/year

Potential PM10 emissions due to soybean loadout	=	Potential PM Emissions * PM10/PM ratio	
a. Max Hourly	=	lb/hour * PM10/PM ratio	
	=	10.4	lbs/hour
b. Max Yearly	=	ton/yr * PM10/PM ratio	
	=	1.6	tons/year
Maximum controlled PM emissions from storage loadout	=	Potential PM emissions * (100 - control efficiency)/100	
a. Max Hourly	=	lb/hr * (100-effy)/100	
	=	3.1	lbs/hour
b. Max Yearly	=	ton/yr * (100-effy)/100	
	=	0.5	tons/year
Maximum controlled PM10 emissions from storage loadout	=	Potential PM10 emissions * (100- control efficiency)/100	
a. Max Hourly	=	lb/hr * (100-effy)/100	
	=	1.0	lbs/hour
b. Max Yearly	=	ton/yr * (100-effy)/100	
	=	0.2	tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for the storage loadout process	=	$55.0 * P^{0.11} - 40$	lbs/hour
	=	$55.0*(\text{north house ton/hr})^{0.11} - 40$	
	=	65.1	lbs/hour
	=	lb/hr*(hr/yr)/(lb/ton)	
	=	285	tons/year
Requested: State allowable PM emissions from the north storage loadout process for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	0.5	tons/year
	=	3.1	pounds/hour

PM emission limit basis: Same as PM emission basis #2. **Limit will be 0.009 lb/ton bean handled, equivalent to 4.2 TPY PM based on production limit**.

SOYBEAN CLEANING PROCESS

Grain Cleaning P4

Grain Cleaner System

PM Emission Factor	0.075	lb/ton	(AP-42,Section 9.9.1, Grain Cleaning)
PM10 Emission Factor	0.075	lb/ton	
PM10/PM ratio	1.000		
Rate/hour	115	tons (max.)	
Rate/year	940,240	tons (crush capacity)	
Capture efficiency	100	%	

Potential PM emissions for soybean cleaner system	=	Emission factor * process rate	
a. Max Hourly	=	(lb/ton)*(ton/hour)	
	=	8.63	lbs/hour
b. Max Yearly	=	(lb/ton)*(ton/year)/(2000 lb/ton)	
	=	35.3	tons/year

Potential PM10 emissions for soybean cleaner system	=	Emission factor * process rate	
a. Max Hourly	=	(lb/ton)*(ton/hour)	
	=	8.63	lbs/hour
b. Max Yearly	=	(lb/ton)*(ton/year)/(2000 lb/ton)	
	=	35.3	tons/year
Maximum controlled PM emissions from feed conveyor, cleaner and scale system	=	baghouse outlet grain loading * gas flow rate	
Filter	19,000	cfm	
Outlet loading	0.005	gr/scf	11/12/98 compliance test - meal loadout: 0.0011 gr/scf
a. Max Hourly	=	(gr/scf)* cfm *60 min/hour /7000 grains/lb	
	=	0.814	pounds/hour
b. Max Yearly	=	max hourly * 8,760hrs/yr / 2000 lb/ton	
		3.57	tons/year
Maximum controlled PM10 emissions from feed conveyor, cleaner and scale system	=	baghouse outlet grain loading * gas flow rate	
a. Max Hourly	=	(gr/scf) * cfm * 60 min/hour / 7000 grains/lb	
	=	0.814	pounds/hour
b. Max Yearly	=	max hourly * (8,760hrs/yr) /(2000 lb/ton)	
		3.57	tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for the cleaning process	=	$55.0* P^{0.11} - 40$	lbs/hour
	=	$55.0*(rate/hr)^{0.11} - 40$	
	=	52.7	lbs/hour
	=	lb/hr*(hr/yr)/(lb/ton)	
	=	231	tons/year
Potential PM emissions from the cleaning process	=	conveyor PM + cleaning system PM	
	=	35.3	tons/year
State allowable PM emissions from the cleaning process for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	3.57	tons/year
	=	0.814	pounds/hour

PM emission limit basis #3: The hourly emission estimates are based on the presumed maximum exhaust grain loading

Soybean Heater P21

Process rate	230,000	lb/hr
	115	ton/hour (Max.)
	940,240	ton/year
PM emissions	0.06	pounds per hour (Preliminary emission test - 4/3/98)
PM emissions	0.008	pounds per hour (Initial compliance emission test - 11/10/98)
PM emissions	0.12	pounds per hour (used for emission calculations)
PM10/PM factor	1.00	

These emissions are emitted from the source without any control.

Potential PM emissions for soybean heater (soybean dryer) = 0.12 pounds per hour

a. Max Hourly = 0.12 lbs/hour

b. Max Yearly = pounds/hour * 8760 hours/year * ton/2000 pounds
= 0.53 tons/year

Potential PM10 emissions for soybean heater	=	Emission factor * process rate		
a. Max Hourly	=	Potential PM * PM10/PM factor		
	=	0.12	lbs/hour	
b. Max Yearly	=	Potential PM * PM10/PM factor		
	=	0.53	tons/year	
Allowable PM emissions from Rule 326 IAC 6-3-2 for the soybean heater	=	$55.0* P^{0.11} - 40$		lbs/hour
	=	$55.0*(\text{rate ton/hr})^{0.11} - 40$		
	=	52.7	lbs/hour	
	=	231	tons/year	
Potential PM emissions from the soybean heater	=	0.53	tons/year	

State allowable PM emissions from the soybean heater for the purpose of permitting are included in the hot dehulling permitted emissions.

SOYBEAN DRYING / CRACKING / DEHULLING PROCESS

Soybean Cracking & Dehulling P5

PM Emission Factor	3.6	lb/ton	(AP-42, Section 9.11.1, Table 4.5)	(Vegetable Oil Processing)
PM10 Emission Factor	2.48	lb/ton		
PM10/PM ratio	0.69		From compliance tests: maximum % of PM of filter vs total:	69%
Process rate	115	ton/hour (Max.)		
Process rate	940,240	ton/year		

Potential PM emissions for soybean cracking & dehulling	=	Emission factor * process rate		
a. Max Hourly	=	(lb/ton * ton/hour)		
	=	414	lbs/hour	
b. Max Yearly	=	lb/ton * ton/year / (lb/ton)		
	=	1,692	tons/year	
Potential PM10 emissions for soybean cracking & dehulling	=	Emission factor * process rate		
a. Max Hourly	=	Potential PM * PM10/PM factor		
	=	285.7	lbs/hour	
b. Max Yearly	=	Potential PM * PM10/PM factor		
	=	1,168	tons/year	

Manufacturer (Crown Co.) guarantee on PM emissions from the bean heater, dryers, crackers, dehulling and hull refining is 12.4 lb/hour at 64,330 acfm at 148°F, 18% relative humidity. This guarantee determines the maximum controlled PM emissions. This emission rate is guaranteed based on information available to the vendor.
Initial compliance testing conducted 11/13/98: 39,667 acfm, 6.02 lb/hr

Maximum controlled PM emissions for soybean cracking & dehulling	=	12.4	lbs/hour
a. Max Hourly	=	12.4	lbs/hour
b. Max Yearly	=	lb/hr * (hr/yr)/ lb/ton	
		54.3	tons/year
Maximum controlled PM10 emissions for the soybean cracking & dehulling	=	Potential PM * PM10/PM factor	
a. Max Hourly	=	lb/hr * PM10/PM ratio	
		8.6	lbs/hour
b. Max Yearly	=	ton/yr * PM10/PM ratio	
		37.5	tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for the cracking & dehulling process	=	$55.0* P^{0.11} - 40$	lbs/hour
	=	$55.0*(\text{rate per hr})^{0.11} - 40$	
	=	52.7	lbs/hour
	=	lb/hr*(hr/yr)/(lb/ton)	
	=	231	tons/year
Potential PM emissions from the cracking & dehulling process	=	cracking & dehulling system PM	
	=	54.3	tons/year
State allowable PM emissions from the cracking & dehulling process for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	54.3	tons/year
	=	12.4	lbs/hour

PM emission limit basis #4: Emission estimates are based on the manufacturer's emissions warrenty (lb/hour)

SOYBEAN FLAKING PROCESS

Flaking Process P19

PM Emission Factor	0.37	lb/ton	(AP-42, Section 9.11.1, Table 4.5)
PM10 Emission Factor	0.23	lb/ton	(Vegetable Oil Processing)
PM10/PM ratio	0.61	0.35/0.57	from AIRS 3/90
Rate/hour	209,705	pounds	% of scale weight: 91.176%
Rate/hour	104.9	tons (Max.)	
Rate/year	857,273	tons	
Capture efficiency	100	%	

Potential PM emissions for soybean flaking	=	Emission factor * process rate	
a. Max Hourly	=	(lb/ton)*(ton/hour)	
	=	38.8	lbs/hour
b. Max Yearly	=	lb/hr*(ton/year)/(2000 lb/ton)	
	=	158.6	tons/year

Potential PM10 emissions for soybean flaking	=	Emission factor * process rate		
a. Max Hourly	=	PM10/PM ratio * lb/hr		
	=	23.8	lbs/hour	
b. Max Yearly	=	(PM10/PM ratio)*(rate ton/year)		
	=	97.4	tons/year	
Maximum controlled PM emissions from flaking system	=	baghouse outlet grain loading * gas flow rate		
Filter	9,000	dscfm	determined from 11/3/99 compliance test on flaker: dscfm	2074
Outlet loading	0.005	gr/dscfm	determined from 11/3/99 compliance test on flaker: gr/sdcfm	0.0018
a. Max Hourly	=	(0.005 gr/scf)* 9,000 scfm *60 min/hour /7000 grains/lb		
	=	0.39	pounds/hour	
b. Max Yearly	=	max hourly * 8,760hrs/yr / 2000 lb/ton		
		1.69	tons/year	
Maximum controlled PM10 emissions from flaking system	=	baghouse outlet grain loading * gas flow rate		
a. Max Hourly	=	(0.005 gr/scf)*9,000 cfm *60 min/hour /7000 grains/lb		
	=	0.39	pounds/hour	
b. Max Yearly	=	max hourly * (8,760hrs/yr) /(2000 lb/ton)		
		1.69	tons/year	
Allowable PM emissions from Rule 326 IAC 6-3-2 for the flaking process	=	$55.0* P^{0.11} - 40$	lbs/hour	
	=	$55.0*(\text{rate ton/hr})^{0.11} - 40$		
	=	51.8	lbs/hour	
	=	227	tons/year	
State allowable PM emissions from the flaking process for the purpose of permitting	=	Construction Permit PM emissions Limits		
	=	1.69	tons/year	
	=	0.39	pounds/hour	
	PM emission limit basis:	Same as PM emission basis #3.		

SOYBEAN EXPANDER P23

PM Emission Factor	0.5	lb/ton	(R.L. Henricks engineering judgment -	
PM10 Emission Factor	0.500	lb/ton	emissions will be similar to bean heater:	
PM10/PM ratio	1.00		soybean oil at ~18% in extruded material.)	
Process rate	50	ton/hour	System capacity:	1200 ton/day
Process rate	438,000	ton/year		
Cyclone Efficiency	90	%		

Potential PM emissions for soybean expander	=	Emission factor * process rate		
a. Max Hourly	=	(lb/ton * ton/hour)		
	=	25.00	lbs/hour	
b. Max Yearly	=	lb/ton * ton/year / (2000 lb/ton)		
	=	109.5	tons/year	

Potential PM10 emissions for soybean expander	=	Emission factor * process rate	
a. Max Hourly	=	Potential PM * PM10/PM factor	
	=	25.00	lbs/hour
b. Max Yearly	=	Potential PM * PM10/PM factor	
	=	109.5	tons/year
Maximum controlled PM emissions for soybean expander	=	Emission factor * process rate * (1-Cyclone Eff./100)	
a. Max Hourly	=	(lb/ton * ton/hour)*(1-Cyclone Eff./100)	
	=	2.50	lbs/hour
b. Max Yearly	=	lb/ton * ton/year / (2000 lb/ton) * (1-Cyclone Eff./100)	
	=	10.95	tons/year
Maximum controlled PM10 emissions for soybean expander	=	Emission factor * process rate * (1-Cyclone Eff./100)	
a. Max Hourly	=	Potential PM * PM10/PM factor	
	=	2.50	lbs/hour
b. Max Yearly	=	Potential PM * PM10/PM factor	
	=	10.95	tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for expander process	=	$55.0* P^{0.11} - 40$	lbs/hour
	=	$55.0*(\text{rate ton/hr})^{0.11} - 40$	
	=	44.6	lbs/hour
	=	195	tons/year
Requested: State allowable PM emissions from expander process for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	10.95	tons/year
	=	2.50	pounds/hour

PM emission limit basis #5: Emission estimates are based on the maximum hourly equipment capacity, the results of an

DTDC MEAL DRYING PROCESS

DTDC Dryer #1 (P10)

PM Emission Factor	1.8	lb/ton	(AP-42, Section 9.11.1, Table 4.5)
PM10 Emission Factor	1.8	lb/ton	(Vegetable Oil Processing)
PM10/PM ratio	1.00		
Rate/hour	166,863	pounds	% of scale weight 72.549%
Rate/hour	83.4	tons	
Rate/year	682,135	tons	
Air volume	8,979	dscfm	determined from 11/4/99 compliance test on meal dryer
PM concentration	0.07	grains/dscf	determined from 11/4/99 compliance test on meal dryer
PM emision rate	5.76	pounds/hr	determined from 11/4/99 compliance test on meal dryer
PM emision rate	10.00	pounds/hr	used for emissions calculations
Cyclone efficiency	95.24	%	determined from 11/4/99 compliance test on meal dryer
Cyclone efficiency	95.0	%	used for emissions calculations

Potential PM emissions for meal drying process	=	Emission factor * process rate	
a. Max Hourly	=	(lb/ton)*(rate ton/hr)	
	=	150.2	lbs/hour
b. Max Yearly	=	(lb/ton)*(ton/year)/(2000 lb/ton)	
	=	614	tons/year

Potential PM10 emissions for meal drying process	=	Emission factor * process rate
a. Max Hourly	=	max PM hrly * PM10/PM ratio
	=	150.2 lbs/hour
b. Max Yearly	=	max PM yrly * PM10/PM ratio
	=	614 tons/year
Maximum controlled PM emissions from meal drying process	=	PM concentration * Air Flow
a. Max Hourly	=	(gr/dscf) * (lb/7000 gr) * (air flow dscfm) * 60 min/hr
	=	10.00 pounds/hour
b. Max Yearly	=	(Max hrly rate) * 8760/2000
		43.8 tons/year
Maximum controlled PM10 emissions from meal drying process	=	PM concentration * PM10/PM ratio * Air Flow
a. Max Hourly	=	(gr/dscf) * PM10/PM ratio * (lb/7000 gr) * (air flow dscfm) * 60 min/hr
	=	10.00 pounds/hour
b. Max Yearly	=	(Max hrly rate) * 8760/2000
		43.8 tons/year

DTDC Dryer #2 (P11)

PM Emission Factor	1.8	lb/ton	(AP-42, Section 9.11.1, Table 4.5)
PM10 Emission Factor	1.8	lb/ton	(Vegetable Oil Processing)
PM10/PM ratio	1.00		
Rate/hour	166,863	pounds	% of scale weight 72.549%
Rate/hour	83.4	tons	
Rate/year	682,135	tons	
Air volume	8,788	dscfm	determined from 11/4/99 compliance test on meal dryer
PM concentration	0.0017	grains/dscf	determined from 11/4/99 compliance test on meal dryer
PM emision rate	0.131	pounds/hr	determined from 11/4/99 compliance test on meal dryer
PM emision rate	1.8	pounds/hr	used for emissions calculations
Cyclone efficiency	99.9	%	determined from 11/4/99 compliance test on meal dryer
Cyclone efficiency	99.0	%	used for emissions calculations

Potential PM emissions for meal drying process	=	Emission factor * process rate
a. Max Hourly	=	(lb/ton)*(rate ton/hr)
	=	150.2 lbs/hour
b. Max Yearly	=	(lb/ton)*(ton/year)/(2000 lb/ton)
	=	614 tons/year
Potential PM10 emissions for meal drying process	=	Emission factor * process rate
a. Max Hourly	=	max PM hrly * PM10/PM ratio
	=	150.2 lbs/hour
b. Max Yearly	=	max PM yrly * PM10/PM ratio
	=	614 tons/year
Maximum controlled PM emissions from meal drying process	=	PM concentration * Air Flow
a. Max Hourly	=	(gr/dscf) * (lb/7000 gr) * (air flow dscfm) * 60 min/hr
	=	1.80 pounds/hour
b. Max Yearly	=	(Max hrly rate) * 8760/2000
		7.88 tons/year

Maximum controlled PM10 emissions from meal drying process	=	PM concentration * PM10/PM ratio * Air Flow	
a. Max Hourly	=	(gr/dscf) * PM10/PM ratio * (lb/7000 gr) * (air flow dscfm) * 60 min/hr	
	=	1.80	pounds/hour
b. Max Yearly	=	(Max hrly rate) * 8760/2000	
		7.88	tons/year
	=	$55.0 * P^{0.11} - 40$	lbs/hour
Allowable PM emissions from Rule 326 IAC 6-3-2 for the meal drying process			
	=	$55.0 * (\text{rate ton/hr})^{0.11} - 40$	
	=	49.5	lbs/hour
	=	ton/hr*8760/2000	
	=	217	tons/year
State allowable PM emissions from the meal drying process for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	51.7	tons/year
	=	11.8	pounds/hr

PM emission limit basis #6: Emission estimates are based on the maximum hourly equipment capacity, the results of an

DTDC MEAL COOLING PROCESS

DTDC Cooler P12

PM Emission Factor	1.9	lb/ton	(AP-42, Section 9.11.1, Table 4.5)
PM10 Emission Factor	1.9	lb/ton	(Vegetable Oil Processing)
PM10/PM ratio	1.00		
Rate/hour	166,863	pounds	% of scale weight 72.549%
Rate/hour	83.4	tons	
Rate/year	682,135	tons	
Air volume	6,751	dscfm	determined from 11/12/98 compliance test on meal cooler
PM concentration	0.0007	grains/dscf	determined from 11/12/98 compliance test on meal cooler
PM emision rate	0.041	pounds/hr	determined from 11/12/98 compliance test on meal cooler
PM emision rate	1.0	pounds/hr	used for emissions calculations
Cyclone efficiency	99.97	%	determined from 11/12/98 compliance test on meal cooler
Cyclone efficiency	99.0	%	used for emissions calculations

Potential PM emissions for meal cooling process	=	Emission factor * process rate	
a. Max Hourly	=	(lb/ton)*(rate ton/hour)	
	=	159	lbs/hour
b. Max Yearly	=	(lb/ton)*(rate ton/year)/(2000 lb/ton)	
	=	648	tons/year
Potential PM10 emissions for meal cooling process	=	Emission factor * process rate	
a. Max Hourly	=	PM hrly rate * PM10/PM ratio	
	=	158.5	lbs/hour
b. Max Yearly	=	PM yrly rate * PM10/PM ratio	
	=	648.0	tons/year

Maximum controlled PM emissions from meal cooling process	=	PM concentration * Air Flow	
a. Max Hourly	=	(gr/scfm) * (lb/7000 gr) * (air flow dscfm) * 60 min/hr	
	=	1.0	pounds/hour
b. Max Yearly	=	(Max hrly rate) * 8760/2000	
		4.4	tons/year
Maximum controlled PM10 emissions from meal cooling process	=	PM concentration * PM10/PM ratio * Air Flow	
a. Max Hourly	=	(gr/scfm) * PM10/PM ratio * (lb/7000 gr) * (air flow dscfm) * 60 min/hr	
	=	1.0	pounds/hour
b. Max Yearly	=	(Max hrly rate) * 8760/2000	
		4.4	tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for meal cooling process	=	$55.0* P^{0.11} - 40$	lbs/hour
	=	$55.0*(\text{rate ton/hr})^{0.11} - 40$	
	=	49.5	lbs/hour
	=	217	tons/year
Current:			
State allowable PM emissions from the meal cooling process for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	54.8	tons/year
	=	12.5	pounds/hr
Requested:			
State allowable PM emissions from the meal cooling process for the purpose of permitting	=	Permit PM emissions Limits (requested)	
	=	4.4	tons/year
	=	1.0	pounds/hr

PM emission limit basis: Same as PM emission basis #6.

MEAL SIZING PROCESS

Meal Sizing P9

Emissions from the meal leg are included in the sizing emissions since both are aspirated by a common baghouse.

PM Emission Factor	3.4	lb/ton	(AP-42, Section 9.11.1, Table 4.5)	
PM10 Emission Factor	2.08	lb/ton	(Vegetable Oil Processing)	
PM10/PM ratio	0.611	(1.1/1.8)	from AIRS 3/90	
Rate/hour	166,863	pounds		
Rate/hour	83.4	tons	% of scale weight	72.549%
Rate/year	682,135	tons		
Capture efficiency	100	%		

Potential PM emissions for meal sizing	=	Emission factor * process rate	
a. Max Hourly	=	(lb/ton)*(rate ton/hour)	
	=	283.7	lbs/hour
b. Max Yearly	=	(lb/ton)*(rate ton/yr)/(2000 lb/ton)	
	=	1,160	tons/year
Potential PM10 emissions for meal sizing	=	Emission factor * process rate	
a. Max Hourly	=	(PM max hrly lb/hr) * PM10/PM ratio	
	=	173.4	lbs/hour
b. Max Yearly	=	(PM max yhrly ton/yr) * PM10/PM ratio	
	=	709	tons/year

Maximum controlled PM emissions from meal sizing	=	baghouse outlet grain loading * gas flow rate	
Filter	4,637	dscfm	detrmined from 11/10/98 compliance test
Outlet loading	0.0065	gr/dscf	determined from 11/10/98 compliance test
a. Max Hourly	=	(gr/dscf) * (dscfm) * 60 min/hour / 7000 grains/lb	
	=	0.26	pounds/hour
b. Max Yearly	=	max hourly * 8,760hrs/yr / 2000 lb/ton	
		1.13	tons/year
Maximum controlled PM10 emissions from meal sizing	=	baghouse outlet grain loading * gas flow rate	
a. Max Hourly	=	(0.0065 gr/scf)*4637 cfm *60 min/hour /7000 grains/lb	
	=	0.26	pounds/hour
b. Max Yearly	=	max hourly * (8,760hrs/yr) /(2000 lb/ton)	
		1.13	tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for meal sizing	=	$55.0 * P^{0.11} - 40$	lbs/hour
	=	$55.0*(\text{rate ton/hr})^{0.11} - 40$	
	=	49.5	lbs/hour
	=	217	tons/year
State allowable PM emissions from meal sizing for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	1.13	tons/year
	=	0.26	pounds/hr
	PM emission limit basis:	Same as PM emission basis #6.	

KAOLIN HANDLING PROCESS

Kaolin Bin P3

PM Emission Factor	1.4	lb/ton	(AP-42, Section 9.9.7-1, Starch Storage Bin)
PM10 Emission Factor	1.4	lb/ton	
Rate/hour	60,000	pounds	
Rate/hour	30	tons	
Rate/year	0.5	% of meal tons	
Meal rate	682,135	tons/year	
Filter	2,400	scfm	
Outlet loading	0.005	gr/scfm	
Potential PM emissions for Kaolin bin	=	Emission factor * process rate	
a. Max Hourly	=	(lb/ton)*(rate ton/hour)	
	=	42.0	lbs/hour
b. Max Yearly	=	(lb/ton)*(0.5/100)*(meal rate ton/hr)(8760 hrs/yr)/(2000 lb/ton)	
	=	2.4	tons/year
Potential PM10 emissions for Kaolin bin	=	Emission factor * process rate	
a. Max Hourly	=	(lb/ton)*(rate ton/hour)	
	=	42.0	lbs/hour
b. Max Yearly	=	(lb/ton)*(0.5/100)(meal rate ton/year)/(2000 lb/ton)	
	=	2.4	tons/year

Maximum controlled PM emissions from Kaolin bin	=	baghouse outlet grain loading * gas flow rate	
a. Max Hourly	=	(gr/scf) * (scfm) * 60 min/hour / 7000 grains/lb	
	=	0.103	pounds/hour
b. Max Yearly	=	(lb/hr)*((0.5/100)*(meal rate ton/yr))/30(ton/hr)/(2000 lb/ton)	
		0.006	tons/year
Maximum controlled PM10 emissions from Kaolin bin	=	baghouse outlet grain loading * gas flow rate	
a. Max Hourly	=	(gr/scf)* (scfm) * 60 min/hour / 7000 grains/lb	
	=	0.103	pounds/hour
b. Max Yearly	=	(lb/hr)*((0.5/100)*(meal rate ton/yr))/30(ton/hr)/(2000 lb/ton)	
		0.006	tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for Kaolin bin	=	$4.10* P^{0.67}$	lbs/hour
	=	$4.10*(\text{rate ton/hr})^{0.67}$	
	=	40	lbs/hour
	=	175	tons/year
State allowable PM emissions from Kaolin bin for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	0.451	tons/year
	=	0.103	pounds/hr
Requested: State allowable PM emissions from Kaolin bin for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	0.451	tons/year
	=	0.103	pounds/hr

PM emission limit basis: Same as PM emission basis #3.

HULL GRINDING PROCESS

Hull grinding P6

PM Emission Factor	2.0	lb/ton	(AP-42, Section 9.11.1, Table 4.5)
PM10 Emission Factor	1.2	lb/ton	(Vegetable Oil Processing)
PM10/PM ratio	0.600	(1.2/2.0)	
Rate/hour	16,100	pounds	(7% of crush))
Rate/hour	8.05	tons	
Rate/year	65,817	tons	

	=	Emission factor * process rate	
Potential PM emissions for hull grinding			
a. Max Hourly	=	(lb/ton)*(rate ton/hour)	
	=	16.1	lbs/hour
b. Max Yearly	=	(lb/ton)*(rate ton/year)/(2000 lb/ton)	
	=	65.8	tons/year
Potential PM10 emissions for hull grinding	=	Emission factor * process rate	
a. Max Hourly	=	(PM max hrly) * (PM10/PM ratio)	
	=	9.7	lbs/hour
b. Max Yearly	=	(PM max yrly) * (PM10/PM ratio)	
	=	39.5	tons/year

Maximum controlled PM emissions from hull grinding	=	baghouse outlet grain loading * gas flow rate	
Filter	750	dscfm	
Outlet loading	0.005	gr/dscf	
a. Max Hourly	=	(gr/dscf) * (dscfm) * 60 min/hour / 7000 grains/lb	
	=	0.032	pounds/hour
b. Max Yearly	=	max hourly * 8,760hrs/yr / 2000 lb/ton	
		0.14	tons/year
Maximum controlled PM10 emissions from hull grinding	=	baghouse outlet grain loading * gas flow rate	
a. Max Hourly	=	(gr/dscf) * (dscfm) * 60 min/hour / 7000 grains/lb	
	=	0.032	pounds/hour
b. Max Yearly	=	max hourly * (8,760hrs/yr) /(2000 lb/ton)	
		0.14	tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for hull grinding	=	$4.10*P^{0.67}$	lbs/hour
	=	$4.10*(\text{rate ton/hr})^{0.67}$	
	=	16.6	lbs/hour
	=	73	tons/year
Allowable PM emissions from hull grinding for permitting	=	Construction Permit PM emissions Limits	
	=	0.14	tons/year
	=	0.032	pounds/hour
	PM emission limit basis:	Same as PM emission basis #3.	

HULL STORAGE AND HANDLING PROCESS

Hull storage bins P7 & P7A

Loading P7

PM Emission Factor	0.03	lb/ton	(May '94 draft AP-42, Section 9.9.1-3)
PM10 Emission Factor	0.015	lb/ton	
PM10/PM ratio	0.5		
Rate/hour	20,000	pounds	
Rate/hour	10	tons	
Rate/year	65,817	tons	
Capture efficiency	100	%	

Potential PM emissions	=	Emission factor * process rate	
a. Max Hourly	=	(lb/ton)*(rate ton/hour)	
	=	0.30	lbs/hour
b. Max Yearly	=	(lb/ton)*(8760 hr/year)/(2000 lb/ton)	
	=	1.3	tons/year
Potential PM10 emissions	=	Emission factor * process rate	
a. Max Hourly	=	(PM max hrly) * (PM10/PM ratio)	
	=	0.15	lbs/hour
b. Max Yearly	=	(PM max yrly) * (PM10/PM ratio)	
	=	0.7	tons/year

Maximum controlled PM emissions = baghouse outlet grain loading * gas flow rate

Filter	4,000	dscfm
Outlet loading	0.005	gr/dscf

a. Max Hourly = (gr/dscf) * (dscfm) * 60 min/hour / 7000 grains/lb
= 0.171 pounds/hour

b. Max Yearly = max hourly * 8,760hrs/yr / 2000 lb/ton
0.75 tons/year

Maximum controlled PM10 emissions = baghouse outlet grain loading * gas flow rate

a. Max Hourly = (gr/dscf) * (dscfm) * 60 min/hour / 7000 grains/lb
= 0.171 pounds/hour

b. Max Yearly = max hourly * (8,760hrs/yr) /(2000 lb/ton)
0.75 tons/year

Unloading P7A

PM Emission Factor	0.03	lb/ton	(May '94 draft AP-42, Section 9.9.1-3)
PM10 Emission Factor	0.015	lb/ton	
PM10/PM ratio	0.5		
Rate/hour	30,000	pounds	
Rate/hour	15	tons	
Rate/year	65,817	tons	
Capture efficiency	100	%	

Potential PM emissions = Emission factor * process rate

a. Max Hourly = (lb/ton)*(rate ton/hour)
= 0.45 lbs/hour

b. Max Yearly = (lb/ton)*(rate ton/hour)/2000
= 1.0 tons/year

Potential PM10 emissions = Emission factor * process rate

a. Max Hourly = (lb/ton)*(rate ton/hour)
= 0.23 lbs/hour

b. Max Yearly = (lb/ton)*(rate ton/yr)/(2000 lb/ton)
= 0.5 tons/year

Maximum controlled PM emissions = baghouse outlet grain loading * gas flow rate

Filter	4,000	dscfm
Outlet loading	0.005	gr/dscf

a. Max Hourly = (gr/dscf) * (dscfm) * 60 min/hour / 7000 grains/lb
= 0.171 pounds/hour

b. Max Yearly = max hourly * 8,760hrs/yr / 2000 lb/ton
0.75 tons/year

Maximum controlled PM10 emissions	=	baghouse outlet grain loading * gas flow rate	
a. Max Hourly	=	(gr/dscf) * (dscfm) * 60 min/hour / 7000 grains/lb	
	=	0.171	pounds/hour
b. Max Yearly	=	max hourly * (8,760hrs/yr) /(2000 lb/ton)	
		0.75	tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for hull storage bins	=	$4.10*P^{0.67}$	lbs/hour
	=	$4.10*(\text{rate ton/hr})^{0.67}$	
	=	19.2	lbs/hour
	=	84	tons/year
Allowable PM emissions from hull storage bins for permitting	=	Construction Permit PM emissions Limits	
	=	1.5	tons/year
	=	0.342	pounds/hour

PM emission limit basis: Same as PM emission basis #3.

HULL PELLET COOLING PROCESS

Hull Pellet Cooling P8

PM Emission Factor	1.0	lb/ton	(T. P. Singha engineering judgment)
PM10 Emission Factor	0.5	lb/ton	
PM10/PM ratio	0.5		
Rate/hour	30,000	pounds	
Rate/hour	15	tons	
Rate/year	65,817	tons	
Capture efficiency	100	%	

Potential PM emissions	=	Emission factor * process rate	
a. Max Hourly	=	(lb/ton)*(rate ton/hour)	
	=	15	lbs/hour
b. Max Yearly	=	(max hrly)*(8760 hr/year)/(2000 lb/ton)	
	=	65.7	tons/year
Potential PM10 emissions	=	Emission factor * process rate	
a. Max Hourly	=	(PM max hrly) * (PM10/PM ratio)	
	=	7.5	lbs/hour
b. Max Yearly	=	(PM max yrly) * (PM10/PM ratio)	
	=	32.9	tons/year
Maximum controlled PM emissions	=	cyclone outlet grain loading * gas flow rate	

Cyclone	12,000	dscfm
Outlet loading	0.05	gr/dscf

a. Max Hourly	=	(gr/dscf) * (dscfm) * 60 min/hour / 7000 grains/lb	
	=	5.1	pounds/hour
b. Max Yearly	=	max hourly * 8,760hrs/yr / 2000 lb/ton	
		22.5	tons/year

Maximum controlled PM10 emissions	=	cyclone outlet grain loading * gas flow rate	
a. Max Hourly	=	(gr/dscf) * (dscfm) * 60 min/hour / 7000 grains/lb	
	=	5.1	pounds/hour
b. Max Yearly	=	max hourly * (8,760hrs/yr) /(2000 lb/ton)	
		22.5	tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for hull pellet cooling	=	$4.10*P^{0.67}$	lbs/hour
	=	$4.10*(\text{rate ton/hr})^{0.67}$	
	=	25.2	lbs/hour
	=	110	tons/year
State allowable PM emissions from hull pellet cooling for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	22.5	tons/year
	=	5.1	pounds/hour

PM emission limit basis #7: The hourly emission estimates are based on the presumed maximum exhaust grain loading

HULL PELLET STORAGE HANDLING PROCESS

Hull pellet storage bins P8A

PM Emission Factor	0.03	lb/ton	(May '94 draft AP-42, Section 9.9.1-3)
PM10 Emission Factor	0.015	lb/ton	
PM10/PM ratio	0.5		
Rate/hour	30,000	pounds	
	15	tons	
Rate/year	65,817	tons	
Capture efficiency	100	%	

Potential PM emissions	=	Emission factor * process rate	
a. Max Hourly	=	(lb/ton)*(rate ton/hour)	
	=	0.45	lbs/hour
b. Max Yearly	=	(max hrly)*(8760 hr/year)/(2000 lb/ton)	
	=	2.0	tons/year
Potential PM10 emissions	=	Emission factor * process rate	
a. Max Hourly	=	(PM max hrly) * (PM10/PM ratio)	
	=	0.23	lbs/hour
b. Max Yearly	=	(PM max yrly) * (PM10/PM ratio)	
	=	1.0	tons/year

Maximum controlled PM emissions	=	baghouse outlet grain loading * gas flow rate	
Filter	4,000	dscfm	
Outlet loading	0.005	gr/dscf	
a. Max Hourly	=	(gr/dscf) * (dscfm) * 60 min/hour / 7000 grains/lb	
	=	0.171	pounds/hour
b. Max Yearly	=	max hourly * 8,760hrs/yr / 2000 lb/ton	
		0.75	tons/year
Maximum controlled PM10 emissions	=	baghouse outlet grain loading * gas flow rate	
a. Max Hourly	=	(gr/dscf) * (dscfm) * 60 min/hour / 7000 grains/lb	
	=	0.171	pounds/hour
b. Max Yearly	=	max hourly * (8,760hrs/yr) /(2000 lb/ton)	
		0.75	tons/year
	=	$4.10*P^{0.67}$	lbs/hour
Allowable PM emissions from Rule 326 IAC 6-3-2 for hull pellet storage bins			
	=	$4.10*(rate)^{0.67}$	
	=	25.2	lbs/hour
	=	110	tons/year
State allowable PM emissions from hull pellet storage bins for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	0.75	tons/year
	=	0.171	pounds/hour

PM emission limit basis: Same as PM emission basis #3.

BARGE RECEIVING / MEAL STORAGE AND LOADOUT PROCESS

Meal storage & meal loadout P20, P14, & P15
The meal conveyors are all totally enclosed conveyors.

PM Emission Factor	0.03	lb/ton	(May '94 draft AP-42, Section 9.9.1-3)
PM10 Emission Factor	0.0044	lb/ton	
PM10/PM ratio	0.148	(.04/0.27)	from AIRS 3/90
Process Rate/hour	167,697	pounds	(Includes 0.5% Kaolin)
	83.8	tons	
Loadout Rate/hour	746,968	pounds	
Rate/year	685,545	tons	(Includes 0.5% Kaolin)
Capture efficiency	100	%	

Meal storage bins P20

Potential PM emissions for meal storage bins	=	Emission factor * process rate	
a. Max Hourly	=	(lb/ton)*(rate ton/hour)	
	=	2.52	lbs/hour
b. Max Yearly	=	(lb/ton)*(rate ton/year)/(2000 lb/ton)	
	=	10.3	tons/year
Potential PM10 emissions for meal storage bins	=	Emission factor * process rate	
a. Max Hourly	=	(PM max hrly) * PM10/PM ratio	
	=	0.37	lbs/hour
b. Max Yearly	=	(PM max yrly) * PM10/PM ratio	
	=	1.5	tons/year

Meal loadout bins P20

Potential PM emissions for meal loadout bins = Emission factor * process rate

a. Max Hourly = (lb/ton)*(loadout rate lb/hr)/2000
= 11.2 lbs/hour

b. Max Yearly = (lb/ton)*(loadout rate ton/yr)/2000
= 10.3 tons/year

Potential PM10 emissions for meal loadout bins = Emission factor * process rate

a. Max Hourly = (PM max hrly) * PM10/PM ratio
= 1.66 lbs/hour

b. Max Yearly = (PM max hrly) * PM10/PM ratio
= 1.5 tons/year

Maximum controlled PM emissions from meal storage & loadout bins = baghouse outlet grain loading * gas flow rate

Filter 6000 scfm
Outlet loading 0.005 gr/scfm 11/12/98 compliance test - meal loadout: 0.0011 gr/cfm

a. Max Hourly = (gr/scf)* (scfm) * 60 min/hour / 7000 grains/lb
= 0.257 pounds/hour

b. Max Yearly = max hourly * 8,760hrs/yr / 2000 lb/ton
1.13 tons/year

Maximum controlled PM10 emissions from meal storage & loadout bins = baghouse outlet grain loading * gas flow rate

a. Max Hourly = (gr/scf)* (scfm) * 60 min/hour / 7000 grains/lb
= 0.257 pounds/hour

b. Max Yearly = max hourly * (8,760hrs/yr) /(2000 lb/ton)
1.13 tons/year

Allowable PM emissions from Rule 326 IAC 6-3-2 for the meal storage & meal loadout bins = $55.0* P^{0.11} - 40$ lbs/hour

= 55.0*(loadout rate ton/hr)$^{0.11}$ - 40
= 65.5 lbs/hour
= 287 tons/year

Potential PM emissions from the meal storage & meal loadout bins = meal storage + meal loadout PM
= 20.6 tons/year

Requested:
State allowable PM emissions from the meal storage & meal loadout bins for the purpose of permitting = Construction Permit PM emissions Limits

= 1.13 tons/year
= 0.257 lbs/hour

PM emission limit basis: Same as PM emission basis #3.

Meal loadout: truck, rail, or barge P14 & P15

PM Emission Factor 0.27 lb/ton (AP-42, Section 9.11.1, Table 4.5)
PM10 Emission Factor 0.04 lb/ton (Vegetable Oil Processing)
PM10/PM ratio 0.148 (0.04/0.27)
Rate/hour 767,697 pounds (production + 300 tph from storage)
Rate/hour 383.8 tons
Rate/year 685,545 tons

= Emission factor * process rate

Potential PM emissions for meal loadout

a. Max Hourly = (lb/ton)*(rate ton/hour)
= 104 lbs/hour

b. Max Yearly = (lb/ton)*(rate ton/yr)/2000
= 92.5 tons/year

Potential PM10 emissions for meal loadout = Emission factor * process rate

a. Max Hourly = (PM max hrly) * PM10/PM ratio
= 15.4 lbs/hour

b. Max Yearly = (PM max yrly) * PM10/PM ratio
= 13.7 tons/year

Meal truck loadout P14

Maximum controlled PM emissions from meal truck loadout = baghouse outlet grain loading * gas flow rate

Filter 16,000 scfm
Outlet loading 0.005 gr/scf 11/12/98 compliance test - meal loadout: 0.0011 gr/cfm

a. Max Hourly = (gr/dscf) * (dscfm) * 60 min/hour / 7000 grains/lb
= 0.7 pounds/hour

b. Max Yearly = max hourly * 8,760hrs/yr / 2000 lb/ton
3.0 tons/year

Maximum controlled PM10 emissions from meal truck loadout = baghouse outlet grain loading * gas flow rate

a. Max Hourly = (gr/dscf) * (dscfm) * 60 min/hour / 7000 grains/lb
= 0.7 pounds/hour

b. Max Yearly = max hourly * (8,760hrs/yr) /(2000 lb/ton)
3.0 tons/year

Allowable PM emissions from Rule 326 IAC 6-3-2 for the truck meal loadout system = $55.0 * P^{0.11} - 40$ lbs/hour

= 55.0*(loadout rate ton/hr)$^{0.11}$ - 40
= 65.8 lbs/hour
= 288 tons/year

Potential PM emissions from the truck meal loadout system = meal loadout PM

= 92.5 tons/year

Requested:
State allowable PM emissions from the truck meal loadout system for the purpose of permitting = Construction Permit PM emissions Limits

= 3.0 tons/year
= 0.7 lbs/hour

PM emission limit basis: Same as PM emission basis #3.

Meal rail or barge loadout P15

Maximum controlled PM emissions from meal barge & rail loadout = baghouse outlet grain loading * gas flow rate

Filter 16,000 scfm 11/12/98 compliance test - meal loadout: 17,488 dscfm
Outlet loading 0.005 gr/scfm 11/12/98 compliance test - meal loadout: 0.0011 gr/cfm

a. Max Hourly = (gr/dscf) * (dscfm) * 60 min/hour / 7000 grains/lb
= 0.7 pounds/hour

b. Max Yearly = max hourly * 8,760hrs/yr / 2000 lb/ton
3.0 tons/year

Maximum controlled PM10 emissions from meal barge & rail loadout	=	baghouse outlet grain loading * gas flow rate	
a. Max Hourly	=	(gr/dscf) * (dscfm) * 60 min/hour / 7000 grains/lb	
	=	0.7	pounds/hour
b. Max Yearly	=	max hourly * (8,760hrs/yr) /(2000 lb/ton)	
		3.0	tons/year
Allowable PM emissions from Rule 326 IAC 6-3-2 for the barge and rail meal loadout systems	=	$55.0 * P^{0.11} - 40$	lbs/hour
	=	$55.0*(\text{loadout rate ton/hr})^{0.11} - 40$	
	=	65.8	lbs/hour
	=	288	tons/year
Potential PM emissions from the barge & rail meal loadout systems	=	meal loadout PM	
	=	92.5	tons/year
Requested: State allowable PM emissions from the barge & rail meal loadout systems for the purpose of permitting	=	Construction Permit PM emissions Limits	
	=	3.0	tons/year
	=	0.7	lbs/hour

PM emission limit basis: Same as PM emission basis #3.

HEATING UNITS

Boilers P17, P18 & P18A

Emission factors for natural gas combustion are from AP42, Tables 1.4-1,-2,-3, revision 03/98.

Heat input/boiler	33.659	Million BTU/hr
Number of boilers	3	
VOC emission factor	48	% of TOC factor
TOC emission factor	5.8	$lb/10^6$ cf n-gas

Unit	PM (lb/unit)	PM10 (lb/unit)	SO2 (lb/unit)	NOx (lb/unit)	VOC (lb/unit)	CO (lb/unit)
million cu. ft. burned	7.6	7.6	0.6	100	5.5	84

Potential natural gas usage	=	3*33.659 million BTU/hr * (8760 hr/year)/(1000 BTU/cu ft)	
	=	884.6	Million cu ft/year

Fuel Use Mcf/yr	PM ton/year	PM10 ton/year	SO2 ton/year	NOx ton/year	VOC ton/year	CO ton/year
884.6	3.36	3.36	0.27	44.2	2.43	37.2

Allowable PM emissions from Rule 326 IAC 6-2-4 for the heating units.	=	1.09/Q^0.26	pounds PM / MM BTU/hr
	=	0.328	pounds PM / MM BTU/hr
	=	11.05	Pounds / hour
	=	48.41	Tons / year

Hexane (VOC) emissions

Expected hexane disappearance (VOC use):	0.19	gal hexane /ton of crush.
	1.05	lb hexane /ton
	5.6	lb hexane /gallon

Requested:
State allowable overall hexane useage from the vegetable oil extraction system for the purpose of permitting = 0.225 gallons hexane /ton of soybeans crushed.

Emission limit basis: BACT analysis solvent use rate reduced by ratio of new process

Process design	=	2760	tons/day
	=	115	tons/hr (Max.)
Base process limit on		365	day/yr operation
Process limit	=	940,240	tons/year
Normal operation	=	365	day/yr operation

Solvent disappearance:

Hexane inventory loss = crush tons/year x gal loss/ton x 5.6 lb/gal x 1 ton/2000 lb
= 494 tons/year

Soybean Oil Extraction Volatile Organic Compounds (VOC) Emissions

Hexane is lost from the extraction and desolventizing operations in soybean extraction plants in many areas. These include:

Point sources

a) Vent system gas during normal operation
b) Desolventized meal dryer 1 and 2
c) Desolventized meal cooler
d) Hexane storage tank

Fugitive emissions

e) Plant start-up / shutdowns
f) Plant upsets
g) General - equipment failures/leaks
h) Solvent samples

Bound in product/by-product

i) Desolventized flakes (meal)
j) Extracted soybean oil
k) Process wastewater

Area 1 - Main gas vent (Mineral Oil Absorber) P13

A. Normal operating conditions

			11/11/98 compliance test
Mineral Oil Absorber discharge maximum	50	ft^3/min air at 90^0F	39 cfm @ 75 F
Mineral Oil Absorber discharge normal	50	% LEL (LEL = 1.2%)	21 % LEL
Crush/Process rate normal	115.000	ton/hr	1.32 lb/hr

Inlet to absorber = (cfm)*(1 lb air/15 cf)*(0.54 lb hexane/0.43 lb air)*60 min/hr)
= 251 lb/hr

Outlet from absorber = (cfm)*(1 lb air/5 cf)*(60 min/hr)*1.2%*50% LEL
= 3.60 lb/hr
= (outlet lb/hr)*(8760 hr/yr) / (2000 lb/ton)
= 15.8 ton/yr

Hexane emissions during normal operation	=	Emission rate/processing rate	
	=	(outlet lb/hr)/(process rate ton/hr)	
	=	0.031	lb/ton crush
Efficiency of absorber	=	(Inlet - Outlet)/Inlet * 100%	
		98.6	%
Requested:			
State allowable hexane emissions from the oil extractor, meal desolventizer, oil desolventizer, solvent separator, and vent system for the purposes of permitting	=	0.084	pounds hexane /ton of soybeans crushed.

Emission limit basis: BACT analysis solvent loss rate reduced by ratio of new process

B. Upset Operating Conditions

Upset frequency (average)	15	times/year
Upset duration (average)	4	hours/occurrence
Air flow rate (maximum)	161	cfm
Hexane outlet concentration (maximum)	100	% LEL

Outlet from absorber (maximum)	=	(cfm)*(100%)*(1.2%)*(1 lb/15 cf)*(60 min/hour)	
	=	7.7	lb/hr
	=	(lb/hr)*(hr/year)/(2000 lb/ton)	
	=	0.23	ton/year
Hexane emissions - upset	=	Emission rate/processing rate	
	=	(ton/yr)*(2000 lb/ton)/(process ton/yr)	
	=	0.0005	lb/ton crush
Total absorber hexane emissions	=	Normal + Upset emissions	
		16.0	ton/year
Hexane emissions during normal operation and upset conditions	=	Emission rate/processing rate	
	=	(loss ton/yr)*(2000 lb/ton)/(crush ton/year)	
	=	0.034	lb/ton crush

Area 2 - Process Waste Water

Normal operating conditions occur at all times, no upsets.
All process waste water is recycled.

Water flow	0	lb/hr
Hexane content	0	ppm

Area 3 - Extracted Soybean Oil

Normal operating conditions occur at all times

Weight % oil in beans	18	%	1998 measurements
Hexane in finished oil	100	ppm	40 ppm

Maximum hexane lost in oil	=	(maximum hexane lost in oil/10^6)*(weight % oil in beans)*(ton beans/hr)*(2000 lb/ton)	
	=	4.1	lb/hr
	=	(maximum hexane lost in oil/10^6)*(weight % oil in beans)*(ton beans/yr)	
	=	16.9	ton/year
Hexane lost in oil	=	(loss lb/hr)/(ton crush/hr)	
	=	0.036	lb/ton crush

Area 4 - Dryer One flake desolventizing P10

A. Normal operating conditions

			1999 compliance tests
Flakes in beans	73	% weight	5.36 lb/hour
Hexane in meal to dryer	250	ppm	
Hexane in meal from dryer	180	ppm	

Maximum hexane emissions	=	(crush ton/hr)*(2000 lb/ton)*(% weight)*(ppm drop/1,000,000)	
	=	11.8	lb/hr
	=	crush ton/year x (% weight) x (ppm drop/1,000,000)	
	=	48.0	ton/yr
Hexane emissions during normal operation	=	Emission rate/processing rate	
	=	(loss lb/hr)/(crush ton/hr)	
	=	0.102	lb/ton crush

B. Upset conditions

Hexane in meal to dryer	2,000	ppm		
Hexane in meal from dryer	1,440	ppm		
Post dryer flake concentration:			1440	ppm hexane

Maximum hexane emissions	=	(crush ton/hr)*(2000 lb/ton)*(% weight)*(ppm drop) ppm	
	=	94.0	lb/hr
	=	(crush ton/yr)*2000 lb/ton / 8760 *(% weight)*(ppm drop) ppm*(60 hour/year)/(2000 lb/ton)	
	=	2.6	ton/yr
Hexane emissions during upset conditions	=	Emission rate/processing rate	
	=	(loss ton/yr)*(2000 lb/tn)/(crush ton/yr)	
	=	0.006	lb/ton crush
Total hexane emissions	=	Emissions during normal operation + upset conditions	
	=	50.7	ton/year
Hexane emissions from Dryer 1	=	(loss ton/year)*(2000 lb/ton)/(ton crush/yr)	
	=	0.108	lb/ton crush

Area 5 - Dryer Two flake desolventizing P11

A. Normal operating conditions

			1999 compliance tests
Flakes in beans	73	% weight	1.58 lb/hour
Hexane in meal to dryer	180	ppm	
Hexane in meal from dryer	150	ppm	

Maximum hexane emissions	=	(crush ton/hr)*(2000 lb/ton)*(% weight)*(ppm drop/1,000,000)	
	=	5.0	lb/hr
	=	(crush ton/year)*(0.73)*(ppm drop)/1,000,000	
	=	20.6	ton/yr

Hexane emissions during normal operation	=	Emission rate/processing rate	
	=	(loss lb/hr)/(crush ton/hr)	
	=	0.044	lb/ton crush

B. Upset conditions

Hexane in meal to dryer	1,440	ppm		
Hexane in meal from dryer	1,200	ppm		
Post dryer flake concentration: i			1200	ppm hexane

Maximum hexane emissions	=	(crush ton/hr)*(2000 lb/ton)*(% weight)*(ppm drop)	
	=	40.3	lb/hr
	=	(crush ton/yr)*2000 lb/ton / 8760 *(% weight)*(ppm drop) ppm*(60 hour/year)/(2000 lb/ton)	
	=	1.1	ton/yr
Hexane emissions during upset conditions	=	Emission rate/processing rate	
	=	(los ton/yr)*(2000 lb/tn)/(crush ton/yr)	
	=	0.002	lb/ton crush
Total hexane emissions	=	Emissions during normal operation + upset conditions	
	=	21.7	ton/year
Hexane emissions from Dryer 2	=	(loss ton/year)*(2000 lb/ton)/(ton crush/yr)	
	=	0.046	lb/ton crush
Total dryer hexane emissions	=	Emissions during normal operation + upset conditions	
	=	72.4	ton/year
Total dryer hexane emissions	=	(loss ton/year)*(2000lb/ton)/(crush ton/year)	
	=	0.154	lb/ton crush

Requested: State allowable hexane emissions from the meal dryer for the purposes of permitting	=	0.30	pounds hexane /ton of soybeans crushed.

Emission limit basis: BACT analysis solvent loss rate reduced by ratio of new process

Area 6 - Cooler flake desolventizing P12

A. Normal operating conditions

Flakes in beans	73	% weight	1998 compliance tests	
Hexane in meal to cooler	150	ppm	1.05	lb/hour
Hexane in meal from cooler	130	ppm		

Maximum hexane emissions	=	(crush ton/hr)*(2000 lb/ton)*(% weight)*(ppm drop/1,000,000)	
	=	3.4	lb/hr
	=	(crush ton/year)*(% weight)*(ppm drop/1,000,000)	
	=	13.7	ton/yr
Hexane emissions during normal operation	=	Emission rate/processing rate	
	=	(loss lb/hr)/(crush ton/hr)	
	=	0.029	lb/ton crush

B. Upset conditions

Hexane in meal to cooler	930	ppm	
Hexane in meal from cooler	806	ppm	
Post dryer flake concentration: i	806	ppm hexane	

Maximum hexane emissions	=	(crush ton/hr)*(2000 lb/ton)*(% weight)*(drop in ppm)	
	=	20.8	lb/hr
	=	(crush ton/yr)*2000 lb/ton / 8760 *(% weight)*(ppm drop) ppm*(60 hour/year)/(2000 lb/ton)	
	=	0.6	ton/yr
Hexane emissions during upset conditions	=	Emission rate/processing rate	
	=	(loss ton/yr)*(2000 lb/tn)/(crush ton/yr)	
	=	0.001	lb/ton crush
Total hexane emissions	=	Emissions during normal operation + upset conditions	
	=	14.3	ton/year
Hexane emissions from cooler	=	(loss ton/year)*(2000 lb/ton)/(ton crush/yr)	
	=	0.030	lb/ton crush
Requested: State allowable hexane emissions from the meal cooler for the purposes of permitting	=	0.051	pounds hexane /ton of soybeans crushed.

Emission limit basis: BACT analysis solvent loss rate reduced by ratio of new process

Area 7 - Hexane Remaining in meal (flakes)

A. Normal operating conditions

Flakes in beans	73	% weight
Hexane in meal	130	ppm

Maximum hexane in meal	=	(ton/hr)*(2000 lb/ton)*(% weight)*(ppm)/(1,000,000}	
	=	21.8	lb/hr
	=	(crush ton/year)*(% weight)*(ppm/1,000,000)	
	=	89.2	ton/yr
Hexane in meal during normal operation	=	Content/processing rate	
	=	(loss lb/hr)/(crush ton/hr)	
	=	0.190	lb/ton crush

B. Upset conditions

Hexane in meal to cooler	806	ppm	
Maximum hexane in meal	=	(ton/hr)*(2000 lb/ton)*(% weight)*(ppm)	
	=	135.3	lb/hr
	=	(loss lb/hr)*(60 hour/year)/(2000 lb/ton)	
	=	4.06	ton/yr
Hexane in meal during upset conditions	=	Emission rate/processing rate	
	=	(loss ton/yr)*(2000 lb/tn)/(crush ton/yr)	
	=	0.009	lb/ton crush
Total hexane in meal	=	Hexane in meal during normal operation + upset conditions	
	=	93.3	ton/year
Hexane in meal	=	(total hexane ton/year)*(2000 lb/ton)/(ton crush/yr)	
	=	0.198	lb/ton crush

Area 8 - Start-up/Shutdowns

Start-up/Shutdown Conditions (Fugitive losses)

Startup solvent loss	11,200	lbs	or	2,000	gal
Shutdown solvent loss	11,200	lbs	or	2,000	gal
Hexane density	5.6	lb/gal			
Total loss for 1 startup/shutdown	22,400	lbs	or	4,000	gal
Duration of startup	2	hrs			
Duration of shutdown	2	hrs			
Duration for 1 startup/shutdown	4	hrs			
Frequency of startup/shutdown	4	times/year			
Total duration	16	hrs/year			

Maximum hexane emissions = (22,400 lb/occ.)/(4 hr/occ.)
= 5,600 lbs/hr

Total Hexane emissions = (loss lb/hr)*(hr/yr)/(2000 lb/ton)
= 44.8 ton/year

Hexane emissions = (loss ton/year)*(2000 lb/ton)/(ton crush/year)
= 0.095 lb/ton crush

Area 9 - Plant Upsets

Upset conditions (Fugitive losses)

When the process system is under pressure assume hexane loss to the atmosphere
is equal to the volume of air normally pulled into the system.

Duration	4	hrs
Frequency	15	times/year
Total duration	60	hrs/year

Flow of air in the flakes = (crush ton/yr / 8760)*(% weight/100)*(2000 lb/ton)*(1 hour/60 min)*(1 cf/60 lb)
= 43.5 cfm

The volume of hexane lost will be equal to the air drawn into the system during normal operations.

Hexane loss = 50 ft^3/min - 43.5 ft^3/min
= 6.5 cfm

Maximum hexane emissions = (cfm)*(60 min/hr)*(1 lb/15 cf)*(4 hour/occ)*(15 occ/yr)*(1 ton/2000 lb)
= 0.78 ton/yr

Hexane emissions due to upsets = (loss ton/year)*(2000 lb/ton)/(ton crush/yr)
= 0.002 lb/ton crush

Area 10 - General Leaks and Equipment Failures (fugitive emissions)

Various potential sources of leaks exist throughout the plant.

Annual leak average	0.5	lb/ton crush (by experience)
It occurs throughout the year.		
No identifiable conditions.		

Average hexane emissions	=	(0.5 lb/ton)*(crush ton/hr)	
	=	57.5	lb/hr
Annual total hexane emissions	=	(0.5 lb/ton)*(crush ton/yr)/(2000 lb/ton)	
	=	235.1	ton/yr

Area 11 - Sampling (fugitive losses)

A small amount of hexane is lost with sampling and unloading of purchased hexane.

Sampling frequency	24	samples/day (during normal operation)
Sample volume	0.1	gallon
Sample content	90	% hexane

Hexane emissions	=	(24 samples/day)*(365 day/year)*(0.1 gal/sample)*(5.6 lb/gal)* (90%/100)*(1 ton/2000 lb)	
	=	2.2	ton/yr
Annual total hexane emissions	=	(loss ton/year)*(2000 lb/ton)/(ton crush/yr)	
	=	0.005	lb/ton crush

Area 12 - Hexane vapors remaining in delivery truck after unloading

Hexane loss	=	(Amount of truck volume emptied)*(lb hexane/lb vapor)* (density of vapor)	
	=	(loss tn/yr)*(2000 lb/tn)*(gal/5.6 lb)*(1 cf/7.48 gal)*(1 lb/15 cf air)* (0.54 lb hexane/0.43 lb air vapor)*(1 ton/2000 lb)	
	=	0.99	ton/yr
Annual total hexane emissions	=	(loss ton/year)*(2000 lb/ton)/(940,240 ton crush/yr)	
	=	0.002	lb/ton crush

Area 13 - Hexane vented from storage tank

Hexane storage is always vented to the mineral absorption system.
Therefore, no tank venting of breathing or working losses to the atmosphere occur.

Hexane loss	=	0.0	ton/yr
	=	0.0	lb/ton crush

Hexane Loss Breakdown (ton/year)

Type of Disappearance	Disappearance Normal Operations (ton/year)	Disappearance Upset Conditions (ton/year)	Disappearance Normal +Upset (ton/year)
Air Emissions-Point Sources			
Vent system (mineral oil absorber)	15.8	0.2	16.0
Desolventized meal dryer 1	48.0	2.6	50.7
Desolventized meal dryer 2	20.6	1.1	21.7
Desolventized meal cooler	13.7	0.6	14.3
Subtotal	98.1	4.6	102.7
Air Emissions-Fugitive			
Start-ups / shutdowns		44.8	44.8
Plant upsets		0.8	0.8
Sampling/hexane unloading	3.2		3.2
General	235.1		235.1
Subtotal	238.3	45.6	283.8
Products & byproducts			
Oil	16.9		16.9
Meal	89.2	4.06	93.3
Waste water	0.0		0.0
Subtotal	106.2	4.1	110.2
Total	442.5	54.2	496.8

Hexane Loss Breakdown (lb/ton)

Type of Disappearance	Disappearance Normal Operations (lb/ton)	Disappearance Upset Conditions (lb/ton)	Disappearance Normal +Upset (lb/ton)
Air Emissions-Point Sources			
Vent system (mineral oil absorber)	0.03	0.0005	0.03
Desolventized meal dryer 1	0.10	0.006	0.11
Desolventized meal dryer 2	0.04	0.002	0.05
Desolventized meal cooler	0.03	0.001	0.03
Subtotal	0.21	0.01	0.22
Air Emissions-Fugitive			
Start-ups / shutdowns		0.10	0.1
Plant upsets		0.002	0.002
Sampling/hexane unloading	0.01		0.01
General	0.5		0.5
Subtotal	0.51	0.10	0.60
Products & byproducts			
Oil	0.04		0.04
Meal	0.19	0.01	0.20
Waste water	0.00		0.00
Subtotal	0.23	0.01	0.23
Total	0.94	0.12	1.05

TSD Appendix A.2.2

Summary of Facility Emissions After the Proposed Modification

POINT SOURCE SUMMARY TABLE **CGB, Mt Vernon, Indiana** April 13, 2000

Source name	Source #	PM Potential (Tons/Yr)	PM Controlled (Tons/Yr)	PM10 Potential (Tons/Yr)	PM10 Controlled (Tons/Yr)	NOx (Tons/Yr)	SOx (Tons/Yr)	CO (Tons/Yr)	VOC (Tons/Yr)	HAP's (Tons/Yr)
TRUCK RECEIVING	1	80.4	2.4	26.4	2.4	0.00	0.00	0.00	0.00	0.00
RAIL/H.B. TRUCK RECEIVING	2	16.5	6.6	3.7	1.5	0.00	0.00	0.00	0.00	0.00
NORTH TRUCK RECEIVING	24	9.7	1.9	3.2	1.9	0.00	0.00	0.00	0.00	0.00
BARGE GRAIN RECEIVING	16	9.4	3.0	2.3	3.0	0.00	0.00	0.00	0.00	0.00
ANNEX SILO LOADING	2A	14.1	1.4	7.1	0.3	0.00	0.00	0.00	0.00	0.00
MERCHANDIZING SILO LOADING	26	2.1	0.6	1.1	0.7	0.00	0.00	0.00	0.00	0.00
NORTH HOUSE BIN LOADING	27	1.6	0.5	0.8	0.2	0.00	0.00	0.00	0.00	0.00
NORTH STORAGE LOADOUT	25	4.6	0.5	1.6	0.2	0.00	0.00	0.00	0.00	0.00
SOYBEAN CLEANING	4	35.3	3.57	35.3	3.57	0.00	0.00	0.00	0.00	0.00
SOYBEAN HEATER	21	0.53	0.0	0.53	0.0	0.00	0.00	0.00	0.00	0.00
SOYBEANCRACKING/DEHULLING	5	1,692	54.3	1,168	37.5	0.00	0.00	0.00	0.00	0.00
SOYBEAN EXPANDER	23	109.5	10.95	109.5	10.95	0.00	0.00	0.00	0.00	0.00
SOYBEAN FLAKING	19	158.6	1.69	97.4	1.69	0.00	0.00	0.00	0.00	0.00
MINERAL OIL ABSORBER	13	0.0	0.0	0.0	0.0	0.00	0.00	0.00	16.0	16.0
DTDC MEAL DRYING	10 & 11	1,228	51.7	1,228	51.7	0.00	0.00	0.00	72.4	72.4
DTDC MEAL COOLING	12	648	4.4	648	4.4	0.00	0.00	0.00	14.3	14.3
MEAL SIZING	9	1,160	1.13	709	1.13	0.00	0.00	0.00	0.00	0.00
KAOLIN HANDLING	3	2.4	0.006	2.4	0.006	0.00	0.00	0.00	0.00	0.00
HULL GRINDING	6	65.8	0.14	39.5	0.14	0.00	0.00	0.00	0.00	0.00
HULL STORAGE LOADING	7	1.3	0.75	0.7	0.75	0.00	0.00	0.00	0.00	0.00
HULL STORAGE UNLOADING	7	1.0	0.75	0.5	0.75	0.00	0.00	0.00	0.00	0.00
HULL PELLET COOLING	8	65.7	22.5	32.9	22.5	0.00	0.00	0.00	0.00	0.00
HULL PELLET STORAGE	8	2.0	0.75	1.0	0.75	0.00	0.00	0.00	0.00	0.00
MEAL STORAGE & LOADOUT BINS	20	20.6	1.13	3.0	1.13	0.00	0.00	0.00	0.00	0.00
TRUCK MEAL LOADOUT	14	92.5	3.0	13.7	3.0	0.00	0.00	0.00	0.00	0.00
BARGE/RAIL MEAL LOADOUT	15	0.0	3.0	0.0	3.0	0.00	0.00	0.00	0.00	0.00
BOILER 1	17	1.1	1.1	1.1	1.1	14.7	0.09	12.4	0.81	0.00
BOILER 2	18	1.1	1.1	1.1	1.1	14.7	0.09	12.4	0.81	0.00
BOILER 3	18A	1.1	1.1	1.1	1.1	14.7	0.09	12.4	0.81	0.00
TOTAL Source Emissions:		5,424.9	180.0	4,138.0	156.5	44.2	0.27	37.2	105.1	102.7

TSD Appendix A.2.2

Summary of Facility Emissions After the Proposed Modification

POINT SOURCE SUMMARY TABLE **CGB, Mt Vernon, Indiana** April 13, 2000

FUGITIVE EMISSIONS SUMMARY TABLE

Source name (Fugitive Emissions)	PM (Tons/Yr)	PM10 (Tons/Yr)	HAP's (Tons/Yr)
TRUCK/RAIL RECEIVING	11.3	3.0	0.00
NORTH STORAGE LOADOUT	0.5	0.2	0.00
BARGE GRAIN RECEIVING	0.5	0.1	0.00
EXTRACTION STARTUP/SHUTDOWN	0.0	0.0	44.8
EXTRACTION UPSETS	0.0	0.0	0.8
EXTRACTION SAMPLING/HEXANE UNLOAD	0.0	0.0	3.2
EXTRACTION GENERAL LOSSES	0.0	0.0	235.1
VEHICLE TRAFFIC	0.57	0.11	0.00
TOTAL Fugitive Emissions:	12.8	3.4	283.8

Note: Remove fugitive emissions for Rail/H.B. Truck Receiving and North Storage Loadout when calculating annual emission inventory (STEPs). Fugitive emissions are included in point source totals listed above.

SOLVENT INVENTORY LOSS Products & Byproducts	HAP's (Tons/Yr)
Oil	16.9
Meal	93.3
Waste Water	0.0
Products & Byproducts	110.2

TSD APPENDIX A.3

Fugitive Dust Emissions Calculations for Truck Traffic

Fugitive PM Emissions Estimate for Paved Roads 13-Apr-00

SCC: 30501039

Distance Traveled on Paved and Unpaved Roads per One-Round Trip

	Paved (miles)	Unpaved (miles)	Total (miles)
Full (40 tons)	0.142	0	0.142
Empty (10 tons)	0.142	0	0.142
Total (miles)	0.284	0	0.284

Information for the emission calculations are based on AP-42 Section 13.2.1 Paved Roads.

E = k [sL/2] 0.65 [W/3]1.5 Equation (1) from 13.2.1, AP-42

where: E = emissions (pounds(lbs)/vehicle mile traveled (VMT))
k = particle size multiplier (pounds per vehicle mile traveled)
sL = road surface silt loading (grams per square meter)
W = average weight (tons) of the vehicles traveling the road

k = 0.082 particle size multiplier (most conservative case, pg 13.2.1-3, AP-42)
sL = 0.08 g/m2 (silt loading for Kings Highway, St. Louis, MO, a midwest collector road, Table 13.2.1-3, AP-42)
W = 23.5 (tons) mean weight (based on distance traveled full and empty)

Therefore,

E = 0.22 lbs/VMT (pounds per vehicle mile traveled)

Calculation of vehicle miles traveled (VMT)

Distance of one one-way trip	0.142	miles	250 yards
Annual receipts	1,081,276	tons	(tons crush + tons from merchandize)
Net weight	60,000	pounds	
	1,000	bushels	
Max. number of one-way trips	7.08	one-way trips/hr	
Hours per year	5,088	hours/year	

VMT = Distance of one-way trip x Number of one-way trips per hour x hours per year

VMT = 5,120 miles per year

Potential fugitive PM emissions per year = E x VMT

= 1,136 pounds per year
= 0.57 tons per year
= 0.22 lbs per hour

TSD APPENDIX A.3

Fugitive Dust Emissions Calculations for Truck Traffic

Fugitive PM10 Emissions Estimate for Paved Roads

Distance Traveled on Paved and Unpaved Roads per One-Round Trip

	Paved (miles)	Unpaved (miles)	Total (miles)
Full (40 tons)	0.142	0.000	0.142
Empty (10 tons)	0.284	0.000	0.142
Total (miles)	0.284	0.000	0.284

Information for the emission calculations are based on AP-42 Section 13.2.1 Paved Roads.

E = k [sL/2] 0.65 [W/3]1.5 Equation (1) from 13.2.1, AP-42

where: E = emissions (pounds(lbs)/vehicle mile traveled (VMT))
k = particle size multiplier (pounds per vehicle mile traveled)
sL = road surface silt loading (grams per square meter)
W = average weight (tons) of the vehicles traveling the road

k = 0.016 particle size multiplier (PM-10, pg 13.2.1-3, AP-42)
sL = 0.08 g/m2 (silt loading for Kings Highway, St. Louis, MO, a midwest collector road, Table 13.2.1-3, AP-42)
W = 23.5 (tons) mean weight (based on distance traveled full and empty)

Therefore,

E = 0.04 lbs/VMT (pounds per vehicle mile traveled)

Calculation of vehicle miles traveled (VMT)

Distance of one one-way trip	0.142	miles
Max. number of one-way trips	7.08	one-way trips per hour
Hours per year	5,088	hours/year

VMT = Distance of one-way trip x Number of one-way trips per hour x hours per year

VMT = 5,120 miles per year

Potential fugitive PM10 emissions per year = E x VMT

=	**222**	**pounds per year**
=	**0.11**	**tons per year**
=	**0.04**	**lbs per hour**