Ms. Ellen Tobias
Eli Lilly and Co.
PO Box 99,
Clinton, Indiana 47842-0099

Re: Significant Source Modification No: 165-12309-00009

Dear Ms.Tobias**:**

Eli Lilly and Company applied for a Part 70 operating permit on October 10, 1996 for its Clinton plant, a pharmaceutical, and animal health products manufacturing source.

An application to modify the source was received on May 19, 2000. This application is for a significant source modification relating to the construction, and operation of the new facilities; modification of some of the animal health production facilities; and pollution control devices. Pursuant to of 326 IAC 2-2 and 40 CFR 52.21, Prevention of Significant Deterioration (PSD), and 326 IAC 2-7-10.5, Significant Source Modification, the following emission units are approved for construction at the source:

Equipment for the finishing operation of Monensin production is as follows:

BLDG	UNIT ID	UNIT DESCRIPTION	CONTROL DEVICE	STACK/VENT ID
C47B	COD480	Drag Conveyor	Bag house VS480, Carbon Adsorber CA520	PVC59AC520
	COD481	Drag Conveyor	Bag house VS480, Carbon Adsorber CA520	PVC59AC520
	COD490	Drag Conveyor	Bag house VS480, Carbon Adsorber CA520	PVC59AC520
	COD491	Drag Conveyor	Bag house VS480, Carbon Adsorber CA520	PVC59AC520
	DS470	Tote Bag Dump Stateion	Bag house VS480, Carbon Adsorber CA520	PVC59AC520
	H431	Hopper	N/A	N/A
	PEL430	Pellet Mill	Bag house VS430A, Carbon Adsorber CA520	PVC59AC520
	RM440	Roller Mill	Bag house VS460, Carbon Adsorber CA520	PVC59AC520
	RM440A	Roller Mill	Bag house VS460, Carbon Adsorber CA520	PVC59AC520
	RM480	Roller Mill	Bag house VS480, Carbon Adsorber CA520	PVC59AC520
	RM481	Roller Mill	Bag house VS480, Carbon Adsorber CA520	PVC59AC520
	SCR450	Screener	Bag house VS460, Carbon Adsorber CA520	PVC59AC520

	SCR451	Screener	Bag house VS460, Carbon Adsorber CA520	PVC59AC520
	SCR490	Screener	Bag house VS480, Carbon Adsorber CA520	PVC59AC520
	SCR491	Screener	Bag house VS480, Carbon Adsorber CA520	PVC59AC520
	VS805	Transfer Bag house	Carbon Adsorber CA520	PVC59AC520
	VS431	Transfer Bag house	Carbon Adsorber CA520	PVC59AC520

The proposed Significant Source Modification approval will be incorporated into the pending Part 70 permit application pursuant to 326 IAC 2-7-10.5(l)(3). If there are no changes to the proposed construction of the emission units, the source may begin operating on the date that IDEM receives an affidavit of construction pursuant to 326 IAC 2-7-10.5(h). If there are any changes to the proposed construction the source can not operate until an Operation Permit Validation Letter is issued.

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 call (800) 451-6027, press 0 and ask for Dr. Trip Sinha or extension (3-3031), or dial (317) 233-3031.

Sincerely,

Paul Dubenetzky, Chief
Permits Branch
Office of Air Management

Attachments
TPS
cc: File - Vermillion County
U.S. EPA, Region V
Vermillion County Health Department
Air Compliance Section Inspector – Marc Goldman
Compliance Data Section - Karen Nowak
Administrative and Development - Janet Mobley
Technical Support and Modeling - Michele Boner

PART 70 SOURCE MODIFICATION
OFFICE OF AIR MANAGEMENT

Eli Lilly and Co.
10500 South State Road 63
Clinton, IN 47842

(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 2-2 and 40 CFR 52.21 (Regulations for preventing significant deterioration of air quality); 40 CFR 124 (Procedures for decision making); and 40 CFR Part 70 Appendix A and contains the conditions and provisions specified in 326 IAC 2-2; and 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.: **SSM 165-12309-00009**	
Issued by: Paul Dubenetzky, Branch Chief Office of Air Management	Issuance Date:

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SECTION A SOURCE SUMMARY

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

A.1 General Information [326 IAC 2-7-4(c)] [326 IAC 2-7-5(15)]

The Permittee owns and operates a research-based corporation, which develops, manufactures, and markets human medicines and animal health products that are manufactured at Clinton Laboratories.

Clinton Labs' animal health production consists of fermentation in building C41, product recovery in building C45 and finishing operation in building C47. Narasin and Monensin are animal health antibiotics produced at Clinton Labs, which are manufactured in these processes.

Responsible Official: Ms. Ellen Tobias
Source Address: 10500 South State Road 63, Clinton, IN 47842
Mailing Address: PO Box 99, Clinton, Indiana 47842-0099
SIC Code: 2834
County Location: Vermillion
County Status: Attainment for all criteria pollutants
Source Status: Part 70 Permit Program
Major under PSD Rules;
Major Source, Section 112 of the Clean Air Act
One of the 26 source category

A.2 Emission Units and Pollution Control Equipment Summary [326 IAC 2-7-4(c)(3)] [326 IAC 2-7-5(15)]

This source is approved to construct and operate the following emission units and pollution control devices:

(a) Equipment for the finishing operation of Monensin production as follows:

BLDG	UNIT ID	UNIT DESCRIPTION	CONTROL DEVICE	STACK/VENT ID
C47	TK132	Mineral Oil Tank	N/A	PVC47TK132
	VS400	Transfer Bag house	**Carbon Adsorber CA520**	**PVC59AC520**
C47B	**COD480**	**Drag Conveyor**	Baghouse VS480, **Carbon Adsorber CA520**	**PVC59AC520**
	COD481	**Drag Conveyor**	Baghouse VS480, **Carbon Adsorber CA520**	**PVC59AC520**
	COD490	**Drag Conveyor**	Baghouse VS480, **Carbon Adsorber CA520**	**PVC59AC520**
	COD491	**Drag Conveyor**	Baghouse VS480, **Carbon Adsorber CA520**	**PVC59AC520**
	COE440	Bucket Elevator	Baghouse VS470, **Carbon Adsorber CA520**	**PVC59AC520**
	COE440A	Bucket Elevator	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	COE450	Bucket Elevator	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	COE451	Bucket Elevator	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	CYC461	Cyclone Separator	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	CYC462	Cyclone Separator	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	CYC463	Cyclone Separator	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	CYC471	Cyclone Separator	Baghouse VS470, **Carbon Adsorber CA520**	**PVC59AC520**

	DS470	**Tote Bag Dump Station**	**Baghouse VS480, Carbon Adsorber CA520**	**PVC59AC520**
	H410	Hopper	N/A	N/A
	H431	**Hopper**	N/A	N/A
	PC430	Pellet Cooler	Baghouse VS430A, **Carbon Adsorber CA520**	**PVC59AC520**
	PEL430	**Pellet Mill**	Baghouse VS430A, **Carbon Adsorber CA520**	**PVC59AC520**
	RM440	**Roller Mill**	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	RM440A	**Roller Mill**	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	RM480	**Roller Mill**	Baghouse VS480, **Carbon Adsorber CA520**	**PVC59AC520**
	RM481	**Roller Mill**	Baghouse VS480, **Carbon Adsorber CA520**	**PVC59AC520**
	SCR450	**Screener**	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	SCR451	**Screener**	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	SCR490	**Screener**	Baghouse VS480, **Carbon Adsorber CA520**	**PVC59AC520**
	SCR491	**Screener**	Baghouse VS480, **Carbon Adsorber CA520**	**PVC59AC520**
	TK410A	Storage Tank	N/A	N/A
	TK410B	Storage Tank	N/A	N/A
	TK420	Storage Tank	Baghouse VS420	PVC47BVS420
	TK453	Waste Sump, Process Water	N/A	PVC47TK453
	VS410	Transfer Baghouse	**Carbon Adsorber CA520**	**PVC59AC520**
	VS430	Transfer Baghouse	**Carbon Adsorber CA520**	**PVC59AC520**
	VS431	**Transfer Baghouse**	**Carbon Adsorber CA520**	**PVC59AC520**
	VS510	Vacuum Cleaning Baghouse	N/A	PVC47BAC510
C47E	BAG813	Bagger	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
	BL808A	Blender	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	BL808B	Blender	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	BL809A	Blender	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	BL809B	Blender	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	BL811A	Blender Mixer	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
	BL811B	Blender Mixer	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
	BS812	Bag Slitter	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	BS812A	Manual Reefed Hopper	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	COE805	Bucket Elevator	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	COE807	Bucket Elevator	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	COS101	Screw Conveyor	N/A	N/A
	COS101B	Screw Conveyor	N/A	N/A
	COS102	Screw Conveyor	N/A	N/A
	COS102A	Screw Conveyor	N/A	N/A
	COS102B	Screw Conveyor	N/A	N/A
	COS103	Screw Conveyor	N/A	N/A
	COS458	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	COS805A	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	COS805B	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	COS805C	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	COS805D	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	COS806A	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	COS806B	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	COS806C	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	COS806D	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	COS807	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	COS807A	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	COS808	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	COS809	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	COS810A	Screw Conveyor	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	COS810B	Screw Conveyor	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	COS810C	Screw Conveyor	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	COS810D	Screw Conveyor	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	COS810E	Screw Conveyor	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	COS811A	Screw Conveyor	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
	COS811B	Screw Conveyor	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
	COS811C	Screw Conveyor	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
	COS812A	Screw Conveyor	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**

	COS812B	Screw Conveyor	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	COS813	Screw Conveyor	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
	DS811	Tote Bag Dump Station	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
	H101	Hopper	Vent Sock S101	PVC47EH101
	H102	Hopper	Vent Sock S102	PVC47EH102
	H103	Hopper	Vent Sock S103	PVC47EH103
	H807	Hopper	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	H807A	Hopper	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	H812	Hopper	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	H813C	Hopper	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
	SCR813	Screener	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
	TK101B	Storage Tank	Vent Sock S101B	PVC47ETK101B
	TK102A	Storage Tank	Vent Sock S102A	PVC47ETK102A
	TK102B	Storage Tank	Vent Sock S102B	PVC47ETK102B
	TK103	Storage Tank	Baghouse VS103	PVC47EVS103A
	TK803	Vegetable Oil Tank	N/A	N/A
	TK803A	Vegetable Oil Tank	N/A	PVC47ETK803A
	TK804A	Mineral Oil Tank	N/A	PVC47ETK804A
	TK806A	Storage Tank	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	TK806B	Storage Tank	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	TK806C	Storage Tank	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	TK806D	Storage Tank	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	TB813	Tote Bag Filler	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
	VS101	Transfer Baghouse	N/A	PVC47EAC101A
	VS102	Transfer Baghouse	N/A	PVC47EAC102A
	VS805	**Transfer Baghouse**	**Carbon Adsorber CA520**	**PVC59AC520**
	VS810A	Transfer Baghouse	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	VS810B	Transfer Baghouse	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	VS810C	Transfer Baghouse	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	VS812	Transfer Baghouse	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	VS815D	Vacuum Cleaning Baghouse	N/A	PVC47EAC815D
	WB805	Weigh Belt	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	WH810A	Weigh Hopper	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	WH810B	Weigh Hopper	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	WH810C	Weigh Hopper	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
C59	**TK1**	**Amyl and Water Tank**	**Carbon Adsorber CA520**	**PVC59AC520**

The equipment described in **bold font** are being added to the existing units to expand finishing capacity for Monensin or to control amyl alcohol emissions. All other pieces of equipment are existing and previously permitted.
The baghouses are an integral part of the process.

(b) Equipment for the finishing operation of Narasin production as follows:

BLDG	UNIT ID	UNIT DESCRIPTION	CONTROL DEVICE	STACK/VENT ID
C47	BAG185	Bagger	Baghouse VS183, **Carbon Adsorber CA190**	**PVC58AC190**
	COE185	Bucket Elevator	Baghouse VS183, **Carbon Adsorber CA190**	**PVC58AC190**
	COS1	Screw Conveyor	N/A	N/A
	COS185	Screw Conveyor	Baghouse VS183, **Carbon Adsorber CA190**	**PVC58AC190**
	CYC2	Cyclone Separator	Baghouse VS2, **Carbon Adsorber CA190**	**PVC58AC190**
	CYC6	Cyclone Separator	Baghouse VS18, **Carbon Adsorber CA190**	**PVC58AC190**
	CYC8	Cyclone Separator	Baghouse VS17, **Carbon Adsorber CA190**	**PVC58AC190**
	H2	Hopper	N/A	N/A
	H3	Hopper	N/A	N/A
	H12	Hopper	N/A	N/A
	HM6	Hammer Mill	N/A	N/A
	HM8	Hammer Mill	N/A	**N/A**
	H180	Hopper	N/A	N/A

	PC6	Pellet Cooler	Baghouse VS7, **Carbon Adsorber CA190**	**PVC58AC190**
	PEL6	Pellet Mill	Baghouse VS7, **Carbon Adsorber CA190**	**PVC58AC190**
	SCR6	Screener	N/A	**N/A**
	SM182	Ribbon Mixer	Baghouse VS183, **Carbon Adsorber CA190**	**PVC58AC190**
	TB185	Tote Bagger	Baghouse VS183, **Carbon Adsorber CA190**	**PVC58AC190**
	TK1A	Storage Tank	Vent Sock S1A	PVC47TK1A
	TK1B	Storage Tank	Vent Sock S1B	PVC47TK1B
	TK6	Transfer Tank	N/A	**N/A**
	TK11A	Storage Tank	Vent Sock S11A	PVC47TK11A
	TK11B	Storage Tank	Vent Sock S11B	PVC47TK11B
	TK132	Mineral Oil Tank	N/A	PVC47TK132
	TK180	Storage Tank	N/A	N/A
	TK181	Storage Tank	Vent Sock S181	PVC47TK181
	VS1	Transfer Bag house	**Carbon Adsorber CA190**	**PVC58AC190**
	VS4	Transfer Bag house	**Carbon Adsorber CA190**	**PVC58AC190**
	VS10	Transfer Bag house	**Carbon Adsorber CA190**	**PVC58AC190**
	VS11	Transfer Bag house	N/A	PVC47AC11
	VS13	Vacuum Cleaning Bag house	N/A	PVC47AC13
	VS170A	Vacuum Cleaning Bag house	N/A	PVC47AC170A
	VS180	Transfer Bag house	**Carbon Adsorber CA190**	**PVC58AC190**
	VS182	Transfer Bag house	**Carbon Adsorber CA190**	**PVC58AC190**
C47E	COS101	Screw Conveyor	N/A	N/A
	COS101A	Screw Conveyor	N/A	N/A
	TK101A	Storage Tank	Vent Sock S101A	PVC47ETK101A
	VS101	Transfer Bag house	N/A	PVC47EAC101A
C58	**TK1**	**Amyl and Water Tank**	**Carbon Adsorber CA190**	**PVC58AC190**

The equipment described in **bold font** is being added to control VOC emissions. All other pieces of equipment listed above are existing and previously permitted.

The baghouses are an integral part of the process.

A.3 Part 70 Permit Applicability [326 IAC 2-7-2]

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

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

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

A.4 Prior Permit and Registration Supersession
That this permit shall supersede all other prior IDEM approvals for the Monensin and Narasin finishing equipment Building C47, C47B and C47E. Specifically, this permit shall supersede the following approvals:

(a) Registration (no tracking number), issued on June 5, 1984;
(b) Registration (no tracking number), issued on May 12, 1989;
(c) Registration CP 165-2493, issued on May 11, 1992; and
(d) Construction permit CP 165-2436, issued on August 31, 1992.

SECTION B GENERAL CONSTRUCTION CONDITIONS

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

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

B.2 Effective Date of the Permit [40CFR 124]

Pursuant to IC 13-15-5-3, 40 CFR 124.15(b), 40 CFR 124.19, and 40 CFR 124.20, this permit shall become effective immediately upon issuance.

B.3 Revocation of Permits [326 IAC 2-2-8]

Pursuant to 326 IAC 2-2-8(a)(1), the Commissioner may revoke this approval if construction is not commenced within eighteen (18) months after receipt of this approval or if construction is suspended for a continuous period of eighteen (18) months or more.

B.4 Significant Source Modification [326 IAC 2-7-10.5(h)]

This document shall also become the approval to operate pursuant to 326 IAC 2-7-10.5(h) when, prior to start of operation, the following requirements are met:

(a) The attached affidavit of construction shall be submitted to the Office of Air Management (OAM), Permit Administration & Development Section, verifying that the emission units were constructed as proposed in the application. The emissions units covered in the Significant Source Modification approval may begin operating on the date the affidavit of construction is postmarked or hand delivered to IDEM if constructed as proposed.

(b) If actual construction of the emissions units differs from the construction proposed in the application, the source may not begin operation until the source modification has been revised pursuant to 326 IAC 2-7-11 or 326 IAC 2-7-12 and an Operation Permit Validation Letter is issued.

(c) If construction is completed in phases; i.e., the entire construction is not done continuously, a separate affidavit must be submitted for each phase of construction. Any permit conditions associated with operation start up dates such as stack testing for New Source Performance Standards (NSPS) shall be applicable to each individual phase.

(d) The Permittee shall receive an Operation Permit Validation Letter from the Chief of the Permit Administration & Development Section and attach it to this document.

B.5 Construction Time Frame
That pursuant to 326 IAC 2-1.1-9(5)(Revocation of Permits), the IDEM may revoke this approval to construct if the:

(a) Construction of carbon adsorbers, and Monensin process expansion has not begun within eighteen (18) months from the effective date of this approval or if during the construction, work is suspended for a continuous period of eighteen (18) months or more.

The OAM may extend such time upon satisfactory showing that an extension, formally requested by the Permittee is justified.

SECTION C GENERAL OPERATION CONDITIONS

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

(a) Where specifically designated by this approval or required by an applicable requirement, any application form, report, or compliance certification submitted under this approval shall contain certification by a responsible official of truth, accuracy, and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

(b) One (1) certification shall be included, on the attached Certification Form, with each submittal.

(c) A responsible official is defined at 326 IAC 2-7-1(34).

C.2 Preventive Maintenance Plan [326 IAC 2-7-5(1)(3) and (13)] [326 IAC 2-7-6(1) and (6)] [326 IAC 1-6-3]

(a) If required by specific condition(s) in Section D of this approval, the Permittee shall prepare and maintain Preventive Maintenance Plans (PMP) within ninety (90) days after commencement of construction, including the following information on each facility:

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

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

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

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

Indiana Department of Environmental Management
Compliance Branch, Office of Air Management
100 North Senate Avenue, P. O. Box 6015
Indianapolis, Indiana 46206-6015

(b) The Permittee shall implement the Preventive Maintenance Plans as necessary to ensure

that failure to implement the Preventive Maintenance Plan does not cause or contribute to a violation of any limitation on emissions or potential to emit.

(c) PMP's shall be submitted to IDEM, OAM, upon request and shall be subject to review and approval by IDEM, OAM. IDEM, OAM, may require the Permittee to revise its Preventive Maintenance Plan whenever lack of proper maintenance causes or contributes to any violation.

(d) Records of preventive maintenance shall be retained for a period of at least five (5) years. These records shall be kept at the source location for a minimum of three (3) years. The records may be stored elsewhere for the remaining two (2) years as long as they are available upon request. If the Commissioner makes a request for records to the Permittee, the Permittee shall furnish the records to the Commissioner within a reasonable time.

C.3 Permit Amendment or Modification [326 IAC 2-7-10.5], [326 IAC 2-7-11] or [326 IAC 2-7-12]

(a) The Permittee must comply with the requirements of 326 IAC 2-7-10.5 whenever the Permittee seeks to amend or modify this approval.

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

Indiana Department of Environmental Management
Permits Branch, Office of Air Management
100 North Senate Avenue, P.O. Box 6015
Indianapolis, Indiana 46206-6015

Any such application should be certified by the "responsible official" as defined by 326 IAC 2-7-1(34) only if a certification is required by the terms of the applicable rule

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

C.4 Opacity [326 IAC 5-1]
Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Exemptions), opacity shall meet the following, unless otherwise stated in this approval:

(a) Opacity shall not exceed an average of forty percent (40%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

(b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute non overlapping integrated averages for a continuous opacity monitor) in a six (6) hour period.

C.5 Stack Height [326 IAC 1-7]

The Permittee shall comply with the applicable provisions of 326 IAC 1-7 (Stack Height Provisions), for all exhaust stacks through which a potential (before controls) of twenty-five (25) tons per year or more of particulate matter is emitted. The provisions of 326 IAC 1-7-2, 326 IAC 1-7-3(c) and (d), 326 IAC 1-7-4(d)(3), (e), and (f); and 326 IAC 1-7-5(d) are not federally enforceable.

Testing Requirements [326 IAC 2-7-6(1)]

C.6 Performance Testing [326 IAC 3-6][326 IAC 2-1.1-11]

(a) All testing shall be performed according to the provisions of 326 IAC 3-6 (Source Sampling Procedures), except as provided elsewhere in this approval, utilizing any applicable procedures and analysis methods specified in 40 CFR 51, 40 CFR 60, 40 CFR 61, 40 CFR 63, 40 CFR 75, or other procedures approved by IDEM, OAM.

A test protocol, except as provided elsewhere in this approval, shall be submitted to:

Indiana Department of Environmental Management
Compliance Data Section, Office of Air Management
100 North Senate Avenue, P. O. Box 6015
Indianapolis, Indiana 46206-6015

no later than thirty-five (35) days prior to the intended test date. The Permittee shall submit a notice of the actual test date to the above address so that it is received at least two weeks prior to the test date.

(b) All test reports must be received by IDEM, OAM no later than forty-five (45) days after the completion of the testing. An extension may be granted by the IDEM, OAM, if the source submits to IDEM, OAM, a reasonable written explanation within five (5) days prior to the end of the initial forty-five (45) day period.

The documentation submitted by the Permittee does not require certification by the "responsible official" as defined by 326 IAC 2-7-1(34).

Compliance Monitoring Requirements [326 IAC 2-7-5(1)] [326 IAC 2-7-6(1)]

C.7 Compliance Monitoring [326 IAC 2-7-5(3)] [326 IAC 2-7-6(1)]

Compliance with applicable requirements shall be documented as required by this approval. All monitoring and record keeping requirements not already legally required shall be implemented within ninety (90) days of approval issuance for existing equipment and upon commencement of operation for new equipment. The Permittee shall be responsible for installing any necessary equipment and initiating any required monitoring related to that. If due to circumstances beyond its control, that equipment cannot be installed and operated within the time frames stated above, the Permittee may extend the compliance schedule related to the equipment for an additional ninety (90) days provided the Permittee notifies:

Indiana Department of Environmental Management
Compliance Branch, Office of Air Management
100 North Senate Avenue, P. O. Box 6015
Indianapolis, Indiana 46206-6015

in writing, prior to the end of the initial timeframe, with full justification of the reasons for the inability to meet this date.

Unless otherwise specified in the approval for the new emission unit(s), compliance monitoring for new emission units or emission units added through a source modification shall be implemented when operation begins.

C.8 Maintenance of Emission Monitoring Equipment [326 IAC 2-7-5(3)(A)(iii)]

(a) In the event that a breakdown of the emission monitoring equipment occurs, a record shall be made of the times and reasons of the breakdown and efforts made to correct the problem. To the extent practicable, supplemental or intermittent monitoring of the parameter should be implemented at intervals no less frequent than required in Section D of this permit until such time as the monitoring equipment is back in operation. In the case of continuous monitoring, supplemental or intermittent monitoring of the parameter should be implemented at intervals no less often than **once an hour** until such time as the continuous monitor is back in operation.

C.9 Monitoring Methods [326 IAC 3] [40 CFR 60] [40 CFR 63]
Any monitoring or testing required by Section D of this permit shall be performed according to the provisions of 326 IAC 3, 40 CFR 60, Appendix A, 40 CFR 60 Appendix B, 40 CFR 63, or other approved methods as specified in this permit.

Corrective Actions and Response Steps [326 IAC 2-7-5] [326 IAC 2-7-6]

C.10 Compliance Monitoring Plan - Failure to Take Response Steps [326 IAC 2-7-5] [326 IAC 2-7-6]

(a) The Permittee is required to implement a compliance monitoring plan to ensure that reasonable information is available to evaluate its continuous compliance with applicable requirements. The compliance monitoring plan can be either an entirely new document, consist in whole of information contained in other documents, or consist of a combination of new information and information contained in other documents. If the compliance monitoring plan incorporates by reference information contained in other documents, the Permittee shall identify as part of the compliance monitoring plan the documents in which the information is found. The elements of the compliance monitoring plan are:

(1) This condition;

(2) The Compliance Determination Requirements in Section D of this permit;

(3) The Compliance Monitoring Requirements in Section D of this permit;

(4) The Record Keeping and Reporting Requirements in Section C (Monitoring Data Availability, General Record Keeping Requirements, and General Reporting Requirements) and in Section D of this permit; and

(5) A Compliance Response Plan (CRP) for each compliance monitoring condition of this permit. CRP=s shall be submitted to IDEM, OAM upon request and shall be subject to review and approval by IDEM, OAM. The CRP shall be prepared within ninety (90) days after issuance of this permit by the Permittee and maintained on site, and is comprised of:

(A) Reasonable response steps that may be implemented in the event that compliance related information indicates that a response step is needed pursuant to the requirements of Section D of this permit; and

(B) A time schedule for taking reasonable response steps including a schedule for devising additional response steps for situations that may not have been predicted.

(b) For each compliance monitoring condition of this permit, reasonable response steps shall be taken when indicated by the provisions of that compliance monitoring condition. Failure to take reasonable response steps may constitute a violation of the permit.

(c) Upon investigation of a compliance monitoring excursion, the Permittee is excused from taking further response steps for any of the following reasons:

(1) A false reading occurs due to the malfunction of the monitoring equipment. This shall be an excuse from taking further response steps providing that prompt action was taken to correct the monitoring equipment.

(2) The Permittee has determined that the compliance monitoring parameters established in the permit conditions are technically inappropriate, has previously submitted a request for an administrative amendment to the permit, and such request has not been denied.~~; or~~

(3) An automatic measurement was taken when the process was not operating.~~; or~~

(4) The process has already returned or is returning to operating within Anormal@ parameters and no response steps are required.

(d) Records shall be kept of all instances in which the compliance related information was not met and of all response steps taken. In the event of an emergency, the provisions of 326 IAC 2-7-16 (Emergency Provisions) requiring prompt corrective action to mitigate emissions shall prevail.

(e) All monitoring required in Section D shall be performed at all times the equipment is operating. If monitoring is required by Section D and the equipment is not operating, then the Permittee may record the fact that the equipment is not operating or perform the required monitoring.

(f) At its discretion, IDEM may excuse the Permittee=s failure to perform the monitoring and record keeping as required by Section D, if the Permittee provides adequate justification and documents that such failures do not exceed five percent (5%) of the operating time in any quarter.

Temporary, unscheduled unavailability of qualified staff shall be considered a valid reason for failure to perform the monitoring or record keeping requirements in Section D.

C.11 Actions Related to Noncompliance Demonstrated by a Stack Test [326 IAC 2-7-5] [326 IAC 2-7-6]

When the results of a stack test performed in conformance with Section C - Performance Testing, of this permit exceed the level specified in any condition of this permit, the Permittee shall take appropriate response actions. The Permittee shall submit a description of these response actions to IDEM, OAM, within thirty (30) days of receipt of the test results. The Permittee shall take appropriate action to minimize excess emissions from the affected facility while the response actions are being implemented.

C.12 **General Record Keeping Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-6]**

(a) Records of all required data, reports and support information shall be retained for a period of at least five (5) years from the date of monitoring sample, measurement, report, or application. These records shall be kept at the source location for a minimum of three (3) years. The records may be stored elsewhere for the remaining two (2) years as long as they are available upon request. If the Commissioner makes a request for records to the Permittee, the Permittee shall furnish the records to the Commissioner within a reasonable time.

(1) All original strip chart recordings for continuous monitoring instrumentation;

(2) All calibration and maintenance records;

(3) Records of preventive maintenance.

(b) Unless otherwise specified in this permit, all record keeping requirements not already legally required shall be implemented within ninety (90) days upon commencement of operation.

C.13 General Reporting Requirements [326 IAC 2-7-5(3)(C)] [326 IAC 2-1.1-11]

(a) The source shall submit the attached Quarterly Deviation and Compliance Monitoring Report or its equivalent. Any deviation from permit requirements, the date(s) of each deviation, the cause of the deviation, and the response steps taken must be reported. This report shall be submitted within thirty (30) days of the end of the reporting period. The Quarterly Deviation and Compliance Monitoring Report shall include the certification by the Aresponsible official@ as defined by 326 IAC 2-7-1(34).

(b) The report required in (a) of this condition and reports required by conditions in Section D of this permit shall be submitted to:

Indiana Department of Environmental Management
Compliance Data Section, Office of Air Management
100 North Senate Avenue, P. O. Box 6015
Indianapolis, Indiana 46206-6015

(c) Unless otherwise specified in this permit, any notice, report, or other submission required by this permit shall be considered timely if the date postmarked on the envelope or certified mail receipt, or affixed by the shipper on the private shipping receipt, is on or before the date it is due. If the document is submitted by any other means, it shall be considered timely if received by IDEM, OAM on or before the date it is due.

(d) Unless otherwise specified in this permit, any report required in Section D of this permit shall be submitted within thirty (30) days of the end of the reporting period. The reports does require the certification by the Aresponsible official@ as defined by 326 IAC 2-7-1(34).

(e) The first report shall cover the period commencing on the date of issuance of this permit and ending on the last day of the reporting period. Reporting periods are based on calendar years.

SECTION D.1 FACILITY OPERATION CONDITIONS

Facility Description [326 IAC 2-7-5(15)]

The information describing the processes contained in these facility description boxes is descriptive information and does not constitute enforceable conditions.

(a) Equipment for the finishing operation of Monensin production as follows:

BLDG	UNIT ID	UNIT DESCRIPTION	CONTROL DEVICE	STACK/VENT ID
C47	TK132	Mineral Oil Tank	N/A	PVC47TK132
	VS400	Transfer Bag house	**Carbon Adsorber CA520**	**PVC59AC520**
C47B	**COD480**	**Drag Conveyor**	Baghouse VS480, **Carbon Adsorber CA520**	**PVC59AC520**
	COD481	**Drag Conveyor**	Baghouse VS480, **Carbon Adsorber CA520**	**PVC59AC520**
	COD490	**Drag Conveyor**	Baghouse VS480, **Carbon Adsorber CA520**	**PVC59AC520**
	COD491	**Drag Conveyor**	Baghouse VS480, **Carbon Adsorber CA520**	**PVC59AC520**
	COE440	Bucket Elevator	Baghouse VS470, **Carbon Adsorber CA520**	**PVC59AC520**
	COE440A	Bucket Elevator	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	COE450	Bucket Elevator	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	COE451	Bucket Elevator	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	CYC461	Cyclone Separator	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	CYC462	Cyclone Separator	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	CYC463	Cyclone Separator	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	CYC471	Cyclone Separator	Baghouse VS470, **Carbon Adsorber CA520**	**PVC59AC520**
	DS470	**Tote Bag Dump Station**	**Baghouse VS480, Carbon Adsorber CA520**	PVC59AC520
	H410	Hopper	N/A	N/A
	H431	**Hopper**	N/A	N/A
	PC430	Pellet Cooler	Baghouse VS430A, **Carbon Adsorber CA520**	**PVC59AC520**
	PEL430	**Pellet Mill**	Baghouse VS430A, **Carbon Adsorber CA520**	**PVC59AC520**
	RM440	**Roller Mill**	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	RM440A	**Roller Mill**	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**

	RM480	**Roller Mill**	Baghouse VS480, **Carbon Adsorber CA520**	**PVC59AC520**
	RM481	**Roller Mill**	Baghouse VS480, **Carbon Adsorber CA520**	**PVC59AC520**
	SCR450	**Screener**	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	SCR451	**Screener**	Baghouse VS460, **Carbon Adsorber CA520**	**PVC59AC520**
	SCR490	**Screener**	Baghouse VS480, **Carbon Adsorber CA520**	**PVC59AC520**
	SCR491	**Screener**	Baghouse VS480, **Carbon Adsorber CA520**	**PVC59AC520**
	TK410A	Storage Tank	N/A	N/A
	TK410B	Storage Tank	N/A	N/A
	TK420	Storage Tank	Baghouse VS420	PVC47BVS420
	TK453	Waste Sump, Process Water	N/A	PVC47TK453
	VS410	Transfer Baghouse	**Carbon Adsorber CA520**	**PVC59AC520**
	VS430	Transfer Baghouse	**Carbon Adsorber CA520**	**PVC59AC520**
	VS431	**Transfer Baghouse**	**Carbon Adsorber CA520**	**PVC59AC520**
	VS510	Vacuum Cleaning Baghouse	N/A	PVC47BAC510
C47E	BAG813	Bagger	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
	BL808A	Blender	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	BL808B	Blender	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	BL809A	Blender	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	BL809B	Blender	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	BL811A	Blender Mixer	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
	BL811B	Blender Mixer	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
	BS812	Bag Slitter	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	BS812A	Manual Reefed Hopper	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	COE805	Bucket Elevator	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	COE807	Bucket Elevator	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	COS101	Screw Conveyor	N/A	N/A
	COS101B	Screw Conveyor	N/A	N/A
	COS102	Screw Conveyor	N/A	N/A
	COS102A	Screw Conveyor	N/A	N/A
	COS102B	Screw Conveyor	N/A	N/A
	COS103	Screw Conveyor	N/A	N/A

COS458	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
COS805A	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
COS805B	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
COS805C	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
COS805D	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
COS806A	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
COS806B	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
COS806C	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
COS806D	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
COS807	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
COS807A	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
COS808	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
COS809	Screw Conveyor	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
COS810A	Screw Conveyor	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
COS810B	Screw Conveyor	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
COS810C	Screw Conveyor	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
COS810D	Screw Conveyor	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
COS810E	Screw Conveyor	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
COS811A	Screw Conveyor	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
COS811B	Screw Conveyor	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
COS811C	Screw Conveyor	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
COS812A	Screw Conveyor	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
COS812B	Screw Conveyor	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
COS813	Screw Conveyor	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
DS811	Tote Bag Dump Station	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**

	H101	Hopper	Vent Sock S101	PVC47EH101
	H102	Hopper	Vent Sock S102	PVC47EH102
	H103	Hopper	Vent Sock S103	PVC47EH103
	H807	Hopper	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	H807A	Hopper	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	H812	Hopper	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	H813C	Hopper	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
	SCR813	Screener	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
	TK101B	Storage Tank	Vent Sock S101B	PVC47ETK101B
	TK102A	Storage Tank	Vent Sock S102A	PVC47ETK102A
	TK102B	Storage Tank	Vent Sock S102B	PVC47ETK102B
	TK103	Storage Tank	Baghouse VS103	PVC47EVS103A
	TK803	Vegetable Oil Tank	N/A	N/A
	TK803A	Vegetable Oil Tank	N/A	PVC47ETK803A
	TK804A	Mineral Oil Tank	N/A	PVC47ETK804A
	TK806A	Storage Tank	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	TK806B	Storage Tank	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	TK806C	Storage Tank	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	TK806D	Storage Tank	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	TB813	Tote Bag Filler	Baghouse VS815B, **Carbon Adsorber CA520**	**PVC59AC520**
	VS101	Transfer Baghouse	N/A	PVC47EAC101A
	VS102	Transfer Baghouse	N/A	PVC47EAC102A
	VS805	**Transfer Baghouse**	**Carbon Adsorber CA520**	**PVC59AC520**
	VS810A	Transfer Baghouse	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	VS810B	Transfer Baghouse	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	VS810C	Transfer Baghouse	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	VS812	Transfer Baghouse	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	VS815D	Vacuum Cleaning Baghouse	N/A	PVC47EAC815D
	WB805	Weigh Belt	Baghouse VS815A, **Carbon Adsorber CA520**	**PVC59AC520**
	WH810A	Weigh Hopper	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	WH810B	Weigh Hopper	Baghouse VS815C, **Carbon Adsorber CA520**	**PVC59AC520**
	WH810C	Weigh Hopper	Baghouse VS815C, **Carbon Adsorber**	**PVC59AC520**

			CA520	
C59	**TK1**	**Amyl and Water Tank**	**Carbon Adsorber CA520**	**PVC59AC520**

The equipment described in **bold font** are being added to the existing units to expand finishing capacity for Monensin or to control VOC emissions. All other pieces of equipment are existing and previously permitted.

Emission Limitations and Standards

D.1.1 Particulate Matter (PM) Emission Limitations [326 IAC 6-3-2]

(a) Pursuant to 326 IAC 6-3-2 (Particulate Emissions Limitations for Process Operations), the Monensin finishing process equipment, shall be limited as follows:

Unit ID	Stack/Vent ID	Maximum Process Weight Rate (tons/hr)	Emissions Limitation (lbs/hr)
See table above for equipment routed to CA520	PVC59AC520	4.55	11.3
TK420	PVC47BVS420	0.03	0.36
H101	PVC47EH101	12.0	21.7
TK101B	PVC47ETK101B	6.00	13.6
VS101*	PVC47EAC101A	12.0	21.7
H102	PVC47EH102	9.60	18.7
TK102A	PVC47ETK102A	4.80	11.7
TK102B	PVC47ETK102B	4.80	11.7
VS102	PVC47EAC102A	9.60	18.7
H103	PVC47EH103	24.0	34.5
TK103	PVC47EAC103A	24.0	34.5

*This equipment is also used in the Narasin finishing process. Therefore, this limit is the same as that stated in Condition D.2.1 for Stack PVC47AC101A.

D.1.2 Best Available Control Technology (BACT) [326 IAC 2-2-3] [40 CFR 52.21] [326 IAC 8-1-6]

Pursuant to 326 IAC 2-2-3 (BACT Requirements), the Permittee shall control volatile organic compound (VOC) emissions from the Monensin finishing operations using a carbon adsorption system as follows:

(a) The carbon adsorber CA520 shall control VOC emissions from the equipment routed to stack PVC59AC520. [326 IAC 2-2-3] [40 CFR 52.21] [326 IAC 8-1-6]

(b) The carbon adsorber CA520 shall be operating at all times that the associated equipment is being operated. However, if there is a malfunction of the carbon adsorber CA520, the Permittee may finish processing any material that has already entered the granulation and finishing process (i.e., the Permittee may not feed any more material from TK410A or TK410B). [326 IAC 2-2-3] [40 CFR 52.21] [326 IAC 8-1-6]

(c) The carbon adsorber CA520 shall reduce VOC emissions by ninety-five percent (95%), as measured by a comparison of the inlet and outlet concentrations to the carbon adsorber, unless outlet concentrations from the carbon adsorber are equal to or less than 10 parts per million (PPM). These limitations shall be achieved within 180 days after commencing operation of the carbon adsorber CA520 and shall be based on a three- (3) hour block average. [326 IAC 2-2-3] [40 CFR 52.21] [326 IAC 8-1-6]

D.1.3 New Source Performance Standard [326 IAC 12] [40 CFR, Part 60]
Pursuant to 326 IAC 12, (40 CFR Part 60.110b, Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels), the permittee shall keep the records of the tank dimension and capacity for the life of the mineral oil tank TK132.

D.1.4 Preventive Maintenance Plan [326 IAC 2-7-5(13)]
A Preventive Maintenance Plan, in accordance with Section B - Preventive Maintenance Plan, of this permit, is required for the Monensin, process equipment and its control device.

D.1.5 Temporary Operations
The Permittee may temporarily operate a new transfer operation (VS805) from product recovery in Building C45 to blending and bagging in Building C47E during the period of shutdown to modify the granulation process. Any transfer equipment and existing equipment utilized during this period must be routed to the carbon adsorber as proposed by this permit. The Permittee shall not operate the new transfer system concurrently with the existing transfer baghouse VS410. Therefore, this operation will not act to debottleneck Monensin production.

Compliance Determination Requirements

D.1.6 Performance Testing [326 IAC 2-1.1-11]
The Permittee is not required by this permit to test for compliance with applicable requirements. However, IDEM may require compliance testing at any specific time when necessary to determine if the facility is in compliance. If testing is required by IDEM, a performance test conducted in accordance with Section C – Performance Testing.

D.1.7 Continuous Emissions Monitoring [326 IAC 2-1.1-11]
To document compliance with Condition D.1.2, the Permittee shall continuously monitor the inlet and outlet VOC concentrations for carbon adsorber CA520.

D.1.8 Record Keeping Requirement

(a) To document compliance with Condition D.1.2, the Permittee shall maintain records of the continuous monitoring of the carbon adsorber CA520.

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

D.1.9 Reporting Requirement [326 IAC 2-7-19]
A quarterly summary of excess emissions shall be submitted to the address listed in Section C - General Reporting Requirements, of this permit, within thirty (30) days after the end of the quarter being reported. The summary shall include the information specified in the reporting form located at the end of this permit. This reporting requirement satisfies the requirement of C13(a).

SECTION D.2 FACILITY OPERATION CONDITIONS

Facility Description [326 IAC 2-7-5(15)]

The information describing the processes contained in these facility description boxes is descriptive information and does not constitute enforceable conditions.

(b) Equipment for the finishing operation of Narasin production as follows:

BLDG	UNIT ID	UNIT DESCRIPTION	CONTROL DEVICE	STACK/VENT ID
C47	BAG185	Bagger	Baghouse VS183, **Carbon Adsorber CA190**	**PVC58AC190**
	COE185	Bucket Elevator	Baghouse VS183, **Carbon Adsorber CA190**	**PVC58AC190**
	COS1	Screw Conveyor	N/A	N/A
	COS185	Screw Conveyor	Baghouse VS183, **Carbon Adsorber CA190**	**PVC58AC190**
	CYC2	Cyclone Separator	Baghouse VS2, **Carbon Adsorber CA190**	**PVC58AC190**
	CYC6	Cyclone Separator	Baghouse VS18, **Carbon Adsorber CA190**	**PVC58AC190**
	CYC8	Cyclone Separator	Baghouse VS17, **Carbon Adsorber CA190**	**PVC58AC190**
	H2	Hopper	N/A	N/A
	H3	Hopper	N/A	N/A
	H12	Hopper	N/A	N/A
	HM6	Hammer Mill	N/A	N/A
	HM8	Hammer Mill	N/A	**N/A**
	H180	Hopper	N/A	N/A
	PC6	Pellet Cooler	Baghouse VS7, **Carbon Adsorber CA190**	**PVC58AC190**
	PEL6	Pellet Mill	Baghouse VS7, **Carbon Adsorber CA190**	**PVC58AC190**
	SCR6	Screener	N/A	**N/A**
	SM182	Ribbon Mixer	Baghouse VS183, **Carbon Adsorber CA190**	**PVC58AC190**
	TB185	Tote Bagger	Baghouse VS183, **Carbon Adsorber CA190**	**PVC58AC190**
	TK1A	Storage Tank	Vent Sock S1A	PVC47TK1A
	TK1B	Storage Tank	Vent Sock S1B	PVC47TK1B
	TK6	Transfer Tank	N/A	**N/A**
	TK11A	Storage Tank	Vent Sock S11A	PVC47TK11A
	TK11B	Storage Tank	Vent Sock S11B	PVC47TK11B
	TK132	Mineral Oil Tank	N/A	PVC47TK132
	TK180	Storage Tank	N/A	N/A
	TK181	Storage Tank	Vent Sock S181	PVC47TK181
	VS1	Transfer Bag house	**Carbon Adsorber CA190**	**PVC58AC190**
	VS4	Transfer Bag house	**Carbon Adsorber CA190**	**PVC58AC190**
	VS10	Transfer Bag house	**Carbon Adsorber CA190**	**PVC58AC190**

	VS11	Transfer Bag house	N/A	PVC47AC11
	VS13	Vacuum Cleaning Baghouse	N/A	PVC47AC13
	VS170A	Vacuum Cleaning Baghouse	N/A	PVC47AC170A
	VS180	Transfer Bag house	**Carbon Adsorber CA190**	**PVC58AC190**
	VS182	Transfer Bag house	**Carbon Adsorber CA190**	**PVC58AC190**
C47E	COS101	Screw Conveyor	N/A	N/A
	COS101A	Screw Conveyor	N/A	N/A
	TK101A	Storage Tank	Vent Sock S101A	PVC47ETK101A
	VS101	Transfer Bag house	N/A	PVC47EAC101A
C58	**TK1**	**Amyl and Water Tank**	**Carbon Adsorber CA190**	**PVC58AC190**

The equipment described in **bold font** is being added to control VOC emissions. All other pieces of equipment listed above are existing and previously permitted.

Emission Limitations and Standards

D.2.1 Particulate Matter (PM) Emission Limitations [326 IAC 6-3-2]
Pursuant to 326 IAC 6-3-2 (Particulate Emissions Limitations for Process Operations), the Monensin finishing process equipment, shall be limited as follows:

Unit ID	Stack/Vent ID	Maximum Process Weight Rate (tons/hr)	Emissions Limitation (lbs/hr)
See table above for equipment routed to CA190	PVC59AC190	2.08	6.71
VS11	PVC47AC11	0.11	0.94
TK11A	PVC47TK11A	0.06	0.59
TK11B	PVC47TK11B	0.06	0.59
TK1A	PVC47TK1A	2.09	6.70
TK1B	PVC47TK1B	2.09	6.70
TK181	PVC47TK181	0.79	3.49
TK101A	PVC47ETK101A	6.00	13.6
VS101*	PVC47EAC101A	12.0	21.7

*This equipment is also used in the Monensin finishing process. Therefore, this limit is the same as that stated in Condition D.1.1 for Stack PVC47AC101A.

D.2.2 Best Available Control Technology (BACT) [326 IAC 2-2-3] [40 CFR 52.21] [326 IAC 8-1-6]
Pursuant to 326 IAC 2-2-3 (BACT Requirements), the Permittee shall control volatile organic compound (VOC) emissions from the Narasin finishing operations using a carbon adsorption system as follows:

(a) The carbon adsorber CA190, as described in the facility description above, shall control the VOC emissions from the equipment routed to stack PVC58AC190. [326 IAC 2-2-3] [40 CFR 52.21] [326 IAC 8-1-6].

(b) The carbon adsorber CA190 shall be operating at all times that the associated equipment is being operated. However, if there is a malfunction of the carbon adsorber CA190, the Permittee may finish processing any material that has already entered the granulation and finishing process (i.e. the Permittee may not feed any more material from TK1A or TK1B). [326 IAC 2-2-3] [40 CFR 52.21] [326 IAC 8-1-6]

(c) The carbon adsorber CA190 shall reduce VOC emissions by ninety-five percent (95%), as measured by a comparison of the inlet and outlet concentrations to the carbon adsorber, unless outlet concentrations from the carbon adsorber are equal to or less than 10 parts per million (PPM). These limitations shall be achieved within 180 days after commencing operation and shall be based on a three (3) hour block average. [326 IAC 2-2-3] [40 CFR 52.21] [326 IAC 8-1-6]

D.2.3 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

A Preventive Maintenance Plan, in accordance with Section B - Preventive Maintenance Plan, of this permit, is required for the Narasin process equipment and its control device.

Compliance Determination Requirements

D.2.4 Performance Testing [326 IAC 2-1.1-11]

The Permittee is not required by this permit to test for compliance with applicable requirements. However, IDEM may require compliance testing at any specific time when necessary to determine if the facility is in compliance. If testing is required by IDEM, a performance test conducted in accordance with Section C – Performance Testing.

D.2.5 Continuous Emissions Monitoring [326 IAC 2-1.1-11]

To document compliance with Condition D.2.2, the Permittee shall continuously monitor the inlet and outlet VOC concentrations for carbon adsorber CA190.

D.2.6 Record Keeping Requirement

(a) To document compliance with Condition D.2.1, the Permittee shall maintain records of daily visible emission notations of the carbon adsorber CA190 stack exhaust.

(b) To document compliance with Condition D.2.2, the Permittee shall maintain records of the continuous monitoring of the carbon adsorber CA190.

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

D.2.7 Reporting Requirement

A quarterly summary of excess emissions shall be submitted to the address listed in Section C - General Reporting Requirements, of this permit, within thirty (30) days after the end of the quarter being reported. The summary shall include the information specified in the reporting form located at the end of this permit. This reporting requirement satisfies the requirement of C13(a).

DATA SECTION

Quarterly Excess Emissions Report

Source Name: Eli Lilly and Company, Clinton Laboratories
Source Address: 10500 South State Road 63, Clinton, Indiana 47842
Mailing Address: P.O. Box 99, Clinton, Indiana 47482
Permit No.: 165-12309-00009
Parameter: VOC Emissions
Limit: 95% reduction or 10-PPM outlet concentration of VOC

REPORTING PERIOD

Quarter: ______________

Year: ______________

Total Operating Hours during Reporting Period: ______________

Start		**End**		**Hours of Excess Emissions**	**Excess Emissions (% of Total Hours)**
Date	**Time**	**Date**	**Time**		
			TOTALS:		

Submitted by: ______________________________

Title/Position: ______________________________

Signature: ______________________________

Date: ______________________________

Phone: ______________________________

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR MANAGEMENT
COMPLIANCE DATA SECTION
PART 70 SOURCE MODIFICATION
CERTIFICATION

Source Name:	Eli Lilly and Company
Source Address:	10500 South State Road 63, Clinton, IN 47842
Mailing Address:	PO Box 99, Clinton, Indiana 47842-0099
Source Modification No.:	SSM 165-12309-00009

This certification shall be included when submitting monitoring, testing reports/results or other documents as required by this approval. Please check what document is being certified: 9 Test Result (specify) 9 Report (specify) 9 Notification (specify) 9 Other (specify)

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete. Signature:
Printed Name:
Title/Position:
Date:

Indiana Department of Environmental Management
Office of Air Management

Technical Support Document (TSD) for a Part 70 Significant Source Modification.

Source Background and Description

Source Name:	**Eli Lilly and Co.**
Source Location:	**10500 South State Road 63, Clinton, IN 47842**
County:	**Vermillion**
SIC Code:	**2834**
Operation Permit No.:	**T 165-2833-00009**
Operation Permit Issuance Date:	**Not Issued**
Significant Source Modification No.:	**165-12309-00009**
Permit Reviewer:	**Dr. T. P. Sinha**

The Office of Air Management (OAM) has reviewed a significant source modification application from Eli Lilly and Company (Lilly) relating to the construction of the new air pollution control devices, new emissions units, and a modification to an animal health finishing process at Clinton Laboratories.

More specifically, Lilly has submitted an application for a Significant Source Modification approval for VOC emissions from their animal health finishing operations in building C47, and to obtain the necessary approval for a capacity expansion for the animal health product Monensin.

Lilly has historically used a mass balance equation to determine the loss of amyl alcohol (a VOC) from product recovery operations in building C45. The mass balance assumes all amyl alcohol emissions occur in the product recovery process and that by the point that dried product is transferred from building C45 to the finishing process in building C47, the material is void of any amyl alcohol. However, as Lilly evaluated modifying the Monensin granulation equipment in building C47, Lilly determined, using a new analytical method, that a substantial amount of amyl alcohol can remain in the dried intermediate product, resulting in significant VOC emissions during the finishing operations in building C47. These emissions have always been reported as part of the annual emissions statement, but have previously been associated with fugitive emissions from in building C45. Therefore, the existing permits for Narasin and Monensin granulation and blending have not accounted for the appropriate amount of VOC emissions from these pieces of equipment. This proposed Significant Source Modification will satisfy the requirements for permitting the VOC emissions from existing equipment.

In addition, Lilly proposes to modify product finishing operations in building C47 to allow increased production of Monensin. Currently, the production of Monensin is bottlenecked by the granulation process in building C47. The modification will consist of the following new equipment in building C47:

- Pelletizer/Pellet Cooler (PEL430/PC430) that will replace an existing pellet mill in the pellet mill/pellet cooler, and vent to an existing fabric filter (VS430A);
- Addition of new material handling equipment and Hopper (H431) that will exhaust to a new fabric filter (VS431);

- Addition of a new mill line (including material handling equipment and dust collector) that includes the following emission units:
  - Tote Bag Dump Station (DS470)
  - Drag Conveyor (COD480)
  - Drag Conveyor (COD481)
  - Drag Conveyor (COD490)
  - Drag Conveyor (COD491)
  - Screener (SCR490)
  - Screener (SCR491)
  - Roller Mill (RM480)
  - Roller Mill (RM481)
  - Dust Collection Baghouse (VS480)
- Two Screeners (SCR450 and SCR451) that will replace existing screeners, and vent to an existing dust collector (VS460).
- Two Roller Mills (RM440 and RM440A) that will replace existing roller mills, and vent to an existing dust collector (VS470).

The increased capacities will be realized by changing three things in the granulation process:

1) Splitting the intermediate Monensin and recycled fines into separate flows into the pellet mill;
2) Replacing the existing pellet mill with one capable of handling increased capacity; and
3) Splitting the flow from the pellet mill into two milling and screening operations.

Currently, these operations serve as the bottleneck for Monensin production. After the proposed project, the bottleneck for Monensin production will be the transfer of material from building C45 to building C47. The proposed equipment for Monensin and Narasin finishing operations is as follows:

(a) Equipment for the finishing operation of Monensin production is as follows:

BLDG	UNIT ID	UNIT DESCRIPTION	CONTROL DEVICE	STACK/VENT ID
C47	TK132	Mineral Oil Tank	N/A	PVC47TK132
	VS400	Transfer Baghouse	Carbon Adsorber CA520	PVC59AC520
C47B	**COD480**	**Drag Conveyor**	**Baghouse VS480, Carbon Adsorber CA520**	**PVC59AC520**
	COD481	**Drag Conveyor**	**Baghouse VS480, Carbon Adsorber CA520**	**PVC59AC520**
	COD490	**Drag Conveyor**	**Baghouse VS480, Carbon Adsorber CA520**	**PVC59AC520**
	COD491	**Drag Conveyor**	**Baghouse VS480, Carbon Adsorber CA520**	**PVC59AC520**
	COE440	Bucket Elevator	Baghouse VS470, Carbon Adsorber CA520	PVC59AC520
	COE440A	Bucket Elevator	Baghouse VS460, Carbon Adsorber CA520	PVC59AC520
	COE450	Bucket Elevator	Baghouse VS460, Carbon Adsorber CA520	PVC59AC520
	COE451	Bucket Elevator	Baghouse VS460, Carbon Adsorber CA520	PVC59AC520
	CYC461	Cyclone Separator	Baghouse VS460, Carbon Adsorber CA520	PVC59AC520
	CYC462	Cyclone Separator	Baghouse VS460, Carbon Adsorber CA520	PVC59AC520

	CYC463	Cyclone Separator	Baghouse VS460, Carbon Adsorber CA520	PVC59AC520
	CYC471	Cyclone Separator	Baghouse VS470, Carbon Adsorber CA520	PVC59AC520
	DS470	**Tote Bag Dump Station**	**Baghouse VS480, Carbon Adsorber CA520**	PVC59AC520
	H410	Hopper	N/A	N/A
	H431	**Hopper**	**N/A**	**N/A**
	PC430	Pellet Cooler	Baghouse VS430A, Carbon Adsorber CA520	PVC59AC520
	PEL430	**Pellet Mill**	**Baghouse VS430A, Carbon Adsorber CA520**	**PVC59AC520**
	RM440	**Roller Mill**	**Baghouse VS460, Carbon Adsorber CA520**	**PVC59AC520**
	RM440A	**Roller Mill**	**Baghouse VS460, Carbon Adsorber CA520**	**PVC59AC520**
	RM480	**Roller Mill**	**Baghouse VS480, Carbon Adsorber CA520**	**PVC59AC520**
	RM481	**Roller Mill**	**Baghouse VS480, Carbon Adsorber CA520**	**PVC59AC520**
	SCR450	**Screener**	**Baghouse VS460, Carbon Adsorber CA520**	**PVC59AC520**
	SCR451	**Screener**	**Baghouse VS460, Carbon Adsorber CA520**	**PVC59AC520**
	SCR490	**Screener**	**Baghouse VS480, Carbon Adsorber CA520**	**PVC59AC520**
	SCR491	**Screener**	**Baghouse VS480, Carbon Adsorber CA520**	**PVC59AC520**
	TK410A	Storage Tank	N/A	N/A
	TK410B	Storage Tank	N/A	N/A
	TK420	Storage Tank	Bag house VS420	PVC47BVS420
	TK453	Waste Sump, Process Water	N/A	PVC47TK453
	VS410	Transfer Bag house	Carbon Adsorber CA520	PVC59AC520
	VS430	Transfer Bag house	Carbon Adsorber CA520	PVC59AC520
	VS431	**Transfer Bag house**	**Carbon Adsorber CA520**	**PVC59AC520**
	VS510	Vacuum Cleaning Bag house	N/A	PVC47BAC510
C47E	BAG813	Bagger	Baghouse VS815B, Carbon Adsorber CA520	PVC59AC520
	BL808A	Blender	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	BL808B	Blender	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	BL809A	Blender	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	BL809B	Blender	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	BL811A	Blender Mixer	Baghouse VS815B, Carbon Adsorber CA520	PVC59AC520
	BL811B	Blender Mixer	Baghouse VS815B, Carbon Adsorber CA520	PVC59AC520
	BS812	Bag Slitter	Baghouse VS815C, Carbon Adsorber CA520	PVC59AC520
	BS812A	Manual Refeed Hopper	Baghouse VS815C, Carbon Adsorber CA520	PVC59AC520
	COE805	Bucket Elevator	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	COE807	Bucket Elevator	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	COS101	Screw Conveyor	N/A	N/A
	COS101B	Screw Conveyor	N/A	N/A
	COS102	Screw Conveyor	N/A	N/A
	COS102A	Screw Conveyor	N/A	N/A
	COS102B	Screw Conveyor	N/A	N/A
	COS103	Screw Conveyor	N/A	N/A
	COS458	Screw Conveyor	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	COS805A	Screw Conveyor	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	COS805B	Screw Conveyor	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	COS805C	Screw Conveyor	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	COS805D	Screw Conveyor	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	COS806A	Screw Conveyor	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	COS806B	Screw Conveyor	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	COS806C	Screw Conveyor	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	COS806D	Screw Conveyor	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	COS807	Screw Conveyor	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	COS807A	Screw Conveyor	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	COS808	Screw Conveyor	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	COS809	Screw Conveyor	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	COS810A	Screw Conveyor	Baghouse VS815C, Carbon Adsorber CA520	PVC59AC520

	COS810B	Screw Conveyor	Baghouse VS815C, Carbon Adsorber CA520	PVC59AC520
	COS810C	Screw Conveyor	Baghouse VS815C, Carbon Adsorber CA520	PVC59AC520
	COS810D	Screw Conveyor	Baghouse VS815C, Carbon Adsorber CA520	PVC59AC520
	COS810E	Screw Conveyor	Baghouse VS815C, Carbon Adsorber CA520	PVC59AC520
	COS811A	Screw Conveyor	Baghouse VS815B, Carbon Adsorber CA520	PVC59AC520
	COS811B	Screw Conveyor	Baghouse VS815B, Carbon Adsorber CA520	PVC59AC520
	COS811C	Screw Conveyor	Baghouse VS815B, Carbon Adsorber CA520	PVC59AC520
	COS812A	Screw Conveyor	Baghouse VS815C, Carbon Adsorber CA520	PVC59AC520
	COS812B	Screw Conveyor	Baghouse VS815C, Carbon Adsorber CA520	PVC59AC520
	COS813	Screw Conveyor	Baghouse VS815B, Carbon Adsorber CA520	PVC59AC520
	DS811	Tote Bag Dump Station	Baghouse VS815B, Carbon Adsorber CA520	PVC59AC520
	H101	Hopper	Vent Sock S101	PVC47EH101
	H102	Hopper	Vent Sock S102	PVC47EH102
	H103	Hopper	Vent Sock S103	PVC47EH103
	H807	Hopper	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	H807A	Hopper	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	H812	Hopper	Baghouse VS815C, Carbon Adsorber CA520	PVC59AC520
	H813C	Hopper	Baghouse VS815B, Carbon Adsorber CA520	PVC59AC520
	SCR813	Screener	Baghouse VS815B, Carbon Adsorber CA520	PVC59AC520
	TK101B	Storage Tank	Vent Sock S101B	PVC47ETK101B
	TK102A	Storage Tank	Vent Sock S102A	PVC47ETK102A
	TK102B	Storage Tank	Vent Sock S102B	PVC47ETK102B
	TK103	Storage Tank	Bag house VS103	PVC47EVS103A
	TK803	Vegetable Oil Tank	N/A	N/A
	TK803A	Vegetable Oil Tank	N/A	PVC47ETK803A
	TK804A	Mineral Oil Tank	N/A	PVC47ETK804A
	TK806A	Storage Tank	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	TK806B	Storage Tank	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	TK806C	Storage Tank	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	TK806D	Storage Tank	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	TB813	Tote Bag Filler	Baghouse VS815B, Carbon Adsorber CA520	PVC59AC520
	VS101	Transfer Baghouse	N/A	PVC47EAC101A
	VS102	Transfer Baghouse	N/A	PVC47EAC102A
	VS810A	Transfer Baghouse	Baghouse VS815C, Carbon Adsorber CA520	PVC59AC520
	VS810B	Transfer Baghouse	Baghouse VS815C, Carbon Adsorber CA520	PVC59AC520
	VS810C	Transfer Baghouse	Baghouse VS815C, Carbon Adsorber CA520	PVC59AC520
	VS812	Transfer Baghouse	Baghouse VS815C, Carbon Adsorber CA520	PVC59AC520
	VS815D	Vacuum Cleaning Baghouse	N/A	PVC47EAC815D
	WB805	Weigh Belt	Baghouse VS815A, Carbon Adsorber CA520	PVC59AC520
	WH810A	Weigh Hopper	Baghouse VS815C, Carbon Adsorber CA520	PVC59AC520
	WH810B	Weigh Hopper	Baghouse VS815C, Carbon Adsorber CA520	PVC59AC520
	WH810C	Weigh Hopper	Baghouse VS815C, Carbon Adsorber CA520	PVC59AC520
C59	**TK1**	**Amyl and Water Tank**	**Carbon Adsorber CA520**	PVC59AC520

The equipment described in **bold font** are being added to the existing units to expand finishing capacity for Monensin or to control amyl alcohol emissions. All other pieces of equipment are existing and previously permitted.

(b) Equipment for the finishing operation of Narasin production as follows:

BLDG	UNIT ID	UNIT DESCRIPTION	CONTROL DEVICE	STACK/VENT ID
C47	BAG185	Bagger	Baghouse VS183, **Carbon Adsorber CA190**	**PVC58AC190**
	COE185	Bucket Elevator	Baghouse VS183, **Carbon Adsorber CA190**	**PVC58AC190**
	COS1	Screw Conveyor	N/A	N/A
	COS185	Screw Conveyor	Baghouse VS183, **Carbon Adsorber CA190**	**PVC58AC190**
	CYC2	Cyclone Separator	Baghouse VS2, **Carbon Adsorber CA190**	**PVC58AC190**
	CYC6	Cyclone Separator	Baghouse VS18, **Carbon Adsorber CA190**	**PVC58AC190**

	CYC8	Cyclone Separator	Baghouse VS17, **Carbon Adsorber CA190**	**PVC58AC190**
	H2	Hopper	N/A	N/A
	H3	Hopper	N/A	N/A
	H12	Hopper	N/A	N/A
	HM6	Hammer Mill	N/A	N/A
	HM8	Hammer Mill	N/A	**N/A**
	H180	Hopper	N/A	N/A
	PC6	Pellet Cooler	Baghouse VS7, **Carbon Adsorber CA190**	**PVC58AC190**
	PEL6	Pellet Mill	Baghouse VS7, **Carbon Adsorber CA190**	**PVC58AC190**
	SCR6	Screener	N/A	**N/A**
	SM182	Ribbon Mixer	Baghouse VS183, **Carbon Adsorber CA190**	**PVC58AC190**
	TB185	Tote Bagger	Baghouse VS183, **Carbon Adsorber CA190**	**PVC58AC190**
	TK1A	Storage Tank	Vent Sock S1A	PVC47TK1A
	TK1B	Storage Tank	Vent Sock S1B	PVC47TK1B
	TK6	Transfer Tank	N/A	**N/A**
	TK11A	Storage Tank	Vent Sock S11A	PVC47TK11A
	TK11B	Storage Tank	Vent Sock S11B	PVC47TK11B
	TK132	Mineral Oil Tank	N/A	PVC47TK132
	TK180	Storage Tank	N/A	N/A
	TK181	Storage Tank	Vent Sock S181	PVC47TK181
	VS1	Transfer Baghouse	Carbon Adsorber CA190	**PVC58AC190**
	VS4	Transfer Baghouse	**Carbon Adsorber CA190**	**PVC58AC190**
	VS10	Transfer Baghouse	**Carbon Adsorber CA190**	**PVC58AC190**
	VS11	Transfer Baghouse	N/A	PVC47AC11
	VS13	Vacuum Cleaning Baghouse	N/A	PVC47AC13
	VS170A	Vacuum Cleaning Baghouse	N/A	PVC47AC170A
	VS180	Transfer Baghouse	Carbon Adsorber CA190	**PVC58AC190**
	VS182	Transfer Baghouse	**Carbon Adsorber CA190**	**PVC58AC190**
C47E	COS101	Screw Conveyor	N/A	N/A
	COS101A	Screw Conveyor	N/A	N/A
	TK101A	Storage Tank	Vent Sock S101A	PVC47ETK101A
	VS101	Transfer Baghouse	N/A	PVC47EAC101A
C58	**TK1**	**Amyl and Water Tank**	**Carbon Adsorber CA190**	**PVC58AC190**

The bag houses are integral part of the process.

The equipment described in **bold font** is being added to control VOC emissions. All other pieces of equipment listed above are existing and previously permitted.

Air Pollution Control Justification as an Integral Part of the Process

The company has submitted the following justification such that the baghouses and air filters before the carbon adsorbers be considered as an integral part of the process:

(a) The primary function of the baghouses and air filters is to recycle product to the process and protect the carbon adsorber from plugging (which reduces the efficiency of the equipment). All processes in the past operated without these air filters in place.

(b) The baghouses and air filters will be environmentally beneficial because these air filters will ensure that the carbon adsorbers operate with minimum malfunctions or breakdown.

(c) The baghouses will be economically beneficial to Lilly because up to 50% of the material being processed comes from baghouse material recycle.

IDEM, OAM has evaluated the justifications and agreed that the baghouses and the air filters will be considered as an integral part of the process. Therefore, the permitting level will be determined using the potential to emit after the air filters. Operating conditions in the proposed permit will specify that these air filters shall operate at all times when the Monensin, and Narasin processes.

Enforcement Issue

There are no enforcement actions pending.

Stack Summary

Stack ID	Operation	Height (feet)	Diameter (feet)	Flow Rate (acfm)	Temperature (^{0}F)
PVC58AC190	Narasin Process	30	2.83	19,610	70
PVC59C520	Monensin Process	30	3.83	39,252	70

Recommendation

The staff recommends to the Commissioner that the Part 70 Significant Source Modification be approved. This recommendation is based on the following facts and conditions:

Unless otherwise stated, information used in this review was derived from the application and additional information submitted by the applicant.

An application for the purposes of this review was received on May 19, 2000.

Emission Calculations

The calculations submitted by the applicant have been verified and found to be accurate and correct. These calculations are provided in Appendix A of this document (Pages 12 through 27).

Source Status

Existing Source PSD Definition (emissions after controls, based upon 8760 hours of operation per year at rated capacity and/or as otherwise limited):

Pollutant	Emissions (tons/year)
VOC	> 100

(a) This existing source is a major stationary source because it is in one of the 28 listed source categories and at least one regulated pollutant is emitted at a rate of 100 tons per year or more.

(b) These emissions were based on emissions data submitted in 1999.

Potential to Emit of Modification

The table below summarizes the potential to emit, reflecting all limits, of the significant emission units after controls. The control equipment is considered federally enforceable only after issuance of this Part 70 source modification.

	Potential to Emit (tons/year)						
Pollutant	PM	PM-10	SO_2	VOC	CO	NO_X	HAPs
Future PTE	15.9	15.9	0.0	1645	0.0	0.0	0.0
Past Actual	33.02	33.02	0.0	1094	0.0	0.0	0.0
Net emissions increase	-17.12	-17.12	0.0	551	0.0	0.0	0.0
PSD Signficant Level	25	15	40	40	100	40	-

* Future VOC emissions were calculated assuming BACT was not there. Because this VOC increase actually existed before the expansion in building C47, potential to emit is calculated before the control. Therefore, this is subject to PSD review.

This modification to an existing major stationary source is major because the emissions increase of VOC is more than the PSD significant level. Therefore, pursuant to 326 IAC 2-2, and 40 CFR 52.21, the PSD requirements apply for VOC emissions.

The table below summarizes the potential to emit of the Narasin and Monensin finishing operations after issuance of this permit.

	Potential to Emit (tons/year)						
Pollutant	PM	PM-10	SO_2	VOC	CO	NO_X	HAPs
Quantity	14.7	14.7	--	47	--	--	--

The potential to emit reflects all limits after air pollution controls. The control equipment is considered federally enforceable only after issuance of this Part 70 source modification.

Part 70 Permit Determination

326 IAC 2-7 (Part 70 Permit Program)

This existing source has submitted their Part 70 permit on October 10, 1996. The equipment being reviewed under this permit shall be incorporated in the submitted Part 70 application.

Federal Rule Applicability

40 CFR Part 60, Subpart Kb

The mineral oil tank no. 132 is subject to New Source Performance Standard, 326 IAC 12, (40 CFR Part 60.110b, Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels), because this tank has a capacity of 117.7 cubic meters, and was constructed in 1992. Pursuant to this rule the permittee must keep the records of the tank dimension and capacity for the life of the tank.

40 CFR Part 60, Subpart VV

The part of the source being modified does not produce synthetic organic intermediate or final product. Therefore it is exempt from the New Source Performance Standard, 326 IAC 12, (40 CFR Part 60.480), Subpart VV - Standards of Performance for Equipment Leaks of VOC In Synthetic Organic Chemical Manufacturing Industry (SOCMI).

40 CFR Part 60, Subpart III

The part of the source being modified does not produce synthetic organic intermediate or final product. Therefore, it is exempt from the New Source Performance Standard, 326 IAC 12, (40 CFR Part 60.610, Subpart III - Standards of Performance for Volatile Organic Compounds (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI)) Air Oxidation Unit Processes.

40 CFR Part 60, Subpart NNN

The part of the source being modified does not produce synthetic organic intermediate or final product. Therefore it is exempt from the New Source Performance Standard, 326 IAC 12,(40 CFR Part 60.660, Subpart NNN - Standards of Performance for Volatile Organic Compounds (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI)) Distillation Operations.

40 CFR Part 60, Subpart RRR

The part of the source being modified does not produce synthetic organic intermediate or final product. Therefore it is exempt from the New Source Performance Standard, 326 IAC 12, (40 CFR Part 60.700, Subpart RRR - Standards of Performance for Volatile Organic Compounds (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI)) Reactor Processes.

40 CFR Part 63, Subparts H and I

The part of the source being modified is not subject to SOCMI HON, 40 CFR 63.190(b)(5) Subparts H, as this source does not produce synthetic organic intermediate or final product and there are no hazardous air pollutants covered under these rules are emitted from the processes.

40 CFR Part 61

The part of the source being modified is not subject to Emission Standard For Hazardous Air Pollutants, 326 IAC 14 and 40 CFR Part 61, as no hazardous air pollutants covered under these rules are emitted from the processes.

40 CFR 52.21 and 326 IAC 2-2-3 (Best Available Control Technology (BACT))

Best Available Control Technology (BACT) is an emission limit based on the maximum degree of pollution reduction, which the OAM determines is achievable on a case-by-case basis taking into consideration energy, environmental, economic, and other cost factors. Any major stationary source that is affected by PSD regulations must conduct an analysis to ensure that BACT is specified for each criteria pollutant that exceeds A significant levels @.

Eli Lilly and Company shall apply best available control technologies for VOC, because this modification has the potential to emit VOC above the significant level. BACT is determined on a case by case basis by reviewing controls on similar processes, BACT used by the OAM, and other states, and new technologies available.

The BACT analysis for VOC has been conducted in accordance with USEPA A Top Down BACT

Guidance @. The RACT/BACT/LAER Clearinghouse and related state permits; and related federal permits issued by other state agencies were reviewed for control technology information.

The OAM reviewed the USEPA RACT/BACT/LAER Clearinghouse (RBLC) for entries for similar operations for Pharmaceutical Operations:

While all of the emission units listed in the USEPA RACT/BACT/LAER Clearinghouse (RBLC) fall under the heading of "pharmaceutical operations," there is considerable variation in the type of process and the nature of the VOC emissions stream. None of the operations are, in fact, similar to the Monensin or Narasin Finishing 0perations, part of this evaluation.

The Office of Air Management has determined from the analysis that BACT for this plant are as follows:

The carbon adsorption system with 95% control or 10 ppmv when the VOC concentration is less than 200 ppm for the Monensin and Narasin Finishing processes.

40 CFR 52.21 and 326 IAC 2-2-4(a) (Air Quality Analysis, Requirements)

326 IAC 2-2-4(a) - PSD application shall contain an analysis of the ambient air quality in the area that the PSD source would affect.

The OAM conducted an air quality analysis of the area where the proposed processing plant is to be located (Clinton, Vermillion County, Indiana) based on information supplied in the application. See Appendix C (Air Quality Analysis) for details of the analyis.

40 CFR 52.21 and 326 IAC 2-2-5 (Air Quality Impacts, Requirements)

326 IAC 2-2-5(c)(1) - Any estimates of ambient air concentrations shall be based upon applicable air quality models, data bases and other requirements specified by the USEPA.

IDEM conducted an evaluation of the air quality impacts due to this modification. See Appendix B (Air Quality Analysis) for details and conclusion.

40 CFR 52.21 and 326 IAC 2-2-6(a) (Increment Consumption, Requirements)

See Appendix C (Air Quality Analysis) for details on the increment consumption analysis and evaluation.

40 CFR 52.21 and 326 IAC 2-2-7 (Additional Analysis, Requirements)

The results of the additional impact analysis conclude the operation of the Eli Lilly and Company plant will have no significant impact on economic growth, soils, vegetation or visibility in the immediate vicinity or on any Class I area.

40 CFR 52.21 and 326 IAC 2-2-10 (Source Obligation)

Eli Lilly and Company has submitted the information necessary to perform analysis or make the determination required under PSD review.

40 CFR 52.21 and 326 IAC 2-2-11 (Stack Height Provisions)

326 IAC 2-2-11(a)(1)- Applies to a source which commenced construction after December 31, 1970.

40 CFR 52.21 and 326 IAC 2-2-12 (Permit Rescission)

The construction permit shall remain in effect, unless it is rescinded, modified, revoked, or expires.

State Rule Applicability

326 IAC 1-5-2 (Emergency Reduction Plans)

The source has submitted an Emergency Reduction Plan (ERP) on March 28, 1998 . The ERP has been verified to fulfill the requirements of 326 IAC 1-5-2 (Emergency Reduction Plans).

326 IAC 1-6-3 (Malfunctions: preventive maintenance plan)

The source will submit the Preventive Maintenance Plan (PMP) at a later date when developed. This PMP will be verified to fulfill the requirements of 326 IAC 1-6-3 (Preventive Maintenance Plan), and included in Title V permit.

326 IAC 1-7 (Stack height provisions)

The potential emissions of particulate matter from the carbon adsorber exhaust gas stack is more than 25 tons per year. Therefore, the carbon adsorber exhaust gas stack shall be constructed using good engineering practice (GEP).

326 IAC 2-1-3(i)(8), 326 IAC 2-1-5, and 326 IAC 2-2-10 (Reopening of Permit):

Pursuant to 326 IAC 2-1-3(i)(8), 326 IAC 2-1-5, and 326 IAC 2-2-10, the Commissioner may require that a permit condition in this permit be modified if necessary to assist in the development of a plan to attain and maintain the eight-hour NAAQS for ozone. Notwithstanding any other provision of 326 IAC 2, a modification to this permit shall be subject to public comment and public hearing and be consistent with the full State Implementation Plan modification developed by the department pursuant to the federal Clean Air Act.

326 IAC 2-1-3.4 (New Source Toxics Control Rule)

There are no HAP emissions from these facilities. Therefore, the requirements of 326 IAC 2-1-3.4 (New Source Toxics Control Rule) to control HAP emissions do not apply.

326 IAC 2-6 (Emission Reporting)

This source is subject to 326 IAC 2-6 (Emission Reporting), because it has the potential to emit more than one hundred (100) tons per year of VOC. Pursuant to this rule, the owner/operator of the source must annually submit an emission statement for the source. The annual statement must be received by July 1 of each year and contain the minimum requirement as specified in 326 IAC 2-6-4. The submittal should cover the period defined in 326 IAC 2-6-2(8)(Emission Statement Operating Year).

326 IAC 5-1 (Opacity Limitations)

Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Alternative Opacity Limitations), opacity shall meet the following, unless otherwise stated in this permit:

(a) Opacity shall not exceed an average of forty percent (40%) any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

(b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor) in a six (6) hour period.

326 IAC 6-3-2 (Process Operations)

Pursuant to 326 IAC 6-3-2 (Particulate Emissions Limitations for Process Operations), the Monensin finishing process equipment, shall be limited as follows:

Unit ID	Stack/Vent ID	Maximum Process Weight Rate (tons/hr)	Emissions Limitation (lbs/hr)
All equipment routed to CA520	PVC59AC520	4.55	11.3

TK420	PVC47BVS420	0.03	0.36
H101	PVC47EH101	12.0	21.7
TK101B	PVC47ETK101B	6.00	13.6
VS101*	PVC47EAC101A	12.0	21.7
H102	PVC47EH102	9.60	18.7
TK102A	PVC47ETK102A	4.80	11.7
TK102B	PVC47ETK102B	4.80	11.7
VS102	PVC47EAC102A	9.60	18.7
H103	PVC47EH103	24.0	34.5
TK103	PVC47EAC103A	24.0	34.5

*This equipment is also used in the Narasin finishing process.

Interpolation of the data for the process weight rate up to sixty thousand (60,000) pounds per hour are accomplished by use of the equation:

$E = 4.10\ P^{0.67}$ where E = rate of emission in pounds per hour and
P = process weight rate in tons per hour

The air filters, and the carbon adsorber shall be in operation at all times the Monensin, and Narasin processes are in operation, in order to comply with this limit.

326 IAC 7 (Sulfur Dioxide Emission Limitations)

Rule 326 IAC 7 does not apply to this modification as the carbon adsorbers are not a fuel combustion facility.

326 IAC 8-1-6 (General provisions relating to VOC rules: general reduction requirements for new facilities)

The facilities having uncontrolled VOC emissions of 25 tons per year, which are not otherwise regulated by other provisions of this article (326 IAC 8), shall reduce VOC emissions using best available control technology (BACT). The PSD BACT for this source satisfies the requirements of rule 326 IAC 8-1-6.

326 IAC 8-5-3 (Synthesized Pharmaceutical Manufacturing Operations)

The part of the source being modified does not produce synthetic organic intermediate or final product, therefore it is exempt 326 IAC 8-5-3.

Testing Requirements

Permittee is installing a continuous monitor to measure the inlet and outlet VOC concentrations for carbon adsorber CA520. Therefore, it is not necessary to test for VOC.

The PM, and PM10 emissions are lower than 10 pounds per hour.

Compliance Requirements

The permits issued under 326 IAC 2-7are required to ensure that sources can demonstrate compliance with applicable state and federal rules on a more or less continuous basis. All state and federal rules contain compliance provisions, however, these provisions do not always fulfill the requirement for a more or less continuous demonstration. When this occurs IDEM, OAM, in conjunction with the source, must develop specific conditions to satisfy 326 IAC 2-7-5. As a result, compliance requirements are divided into two sections: Compliance Determination Requirements and Compliance Monitoring Requirements.

Compliance Determination Requirements in Section D of the permit are those conditions that are found more or less directly within state and federal rules and the violation of which serves as grounds for enforcement action. If these conditions are not sufficient to demonstrate continuous compliance, they will be supplemented with Compliance Monitoring Requirements, also Section D of the permit. Unlike Compliance Determination Requirements, failure to meet Compliance Monitoring conditions would serve as a trigger for corrective actions and not grounds for enforcement action. However, a violation in relation to a compliance monitoring condition will arise through a source failure to take the appropriate corrective actions within a specific time period.

The compliance monitoring requirements applicable to this source are as follows:

1. The air applicable compliance monitoring conditions as specified below:

   The VOC concentrations of inlet and outlet of the carbon adsorbers CA 520 and CA 190 shall be monitored continuously. The outlet concentrations of the adsorbers shall not exceed 10 ppm by volume.

   This monitoring condition is necessary to fulfill the requirements of the BACT for Monensin and Narasin processes.

Conclusion

The construction of this proposed modification shall be subject to the conditions of the attached proposed Part 70 Significant Source Modification No. 165-12309-00009.

Appendix A

Emissions Calculations

Eli Lilly and Company has submitted an application for Significant Source Modification permit for VOC emissions from the finishing operations (C47) and to obtain the necessary approval for capacity expansion to the animal health production of Monensin.

Eli Lilly and Company (Lilly) is a research-based corporation which develops, manufactures, and markets human medicines and animal health products. Human medicines and animal health products are manufactured at Lilly's Clinton Laboratories.

Clinton Labs' animal health production consists of fermentation in building C41, product recovery in building C45 and finishing operation in building C47. Narasin and Monensin are animal health antibiotics produced at Clinton Labs, which are manufactured in these processes.

The animal health production operations begin with the non-dedicated fermentation process in building C41, which has the capability of producing any of the three animal health products made at Clinton Labs.

The next step in the process is product recovery in building C45 where the antibiotic, either Narasin or Monensin, is recovered from the fermentation broth. Product recovery involves separation of the antibiotics from the broth with evaporators and centrifuges, using amyl alcohol to drive the extraction. The antibiotic is then mixed with an inert material such as clay or rice hulls to obtain desired potency. The last step is drying the product to drive off any remaining residual fluids.

The dried product is then sent to finishing in building C47, which involves three basic stages: granulation, formulation, and packaging. Generally, the dry product is formed into pellets or noodles, crushed into finer sizes by rollermills or hammermills, screened into acceptable sizes and packaged into tote bags or smaller bags.

The above process has particulate matter emissions associated with product drying, milling, and handling, as well as VOC emissions associated with the use and loss of amyl alcohol.

The existing processes have been permitted by IDEM as follows:

Permit Number	Issue Date	Process Permitted
83-09-91-0082 (operation permit renewal)	December 8, 1987	Original Product Recovery (C45) and Finishing (C47) operations for Monensin, Narasin and Tylosin
Registration (no number)	June 5, 1984	Monensin Granulation (C47B)
CP 165-1966	March 18, 1991	Narasin Product Recovery (C45A)
CP 165-2436	August 31, 1992	Monensin Blending (C47E)
CP 165-3493 (registration)	June 20, 1994	Tank Farm (C45)

Lilly has historically used a mass balance equation to determine the loss of amyl alcohol during product recovery. It has been assumed that essentially all amyl alcohol emissions occur in the product recovery process and that by the point that dried product is transferred from in building C45 to the finishing process in building C47, the material is void of any amyl alcohol. However, as Lilly evaluated modifying the Monensin granulation equipment in building C47, Lilly determined, using a new analytical method, that a substantial amount of amyl alcohol can remain in the dried intermediate product, resulting in significant VOC emissions during the finishing operations in building C47. These emissions have always been reported as part of the annual emissions statement, but have previously been associated with fugitive emissions from in building C45. Therefore, the existing permits for Narasin and Monensin granulation and blending have not accounted for the appropriate amount of VOC emissions from these pieces of equipment.

The following sections explain the proposed modification to the Monensin granulation process, the emissions estimates from the existing and proposed Monensin and Narasin granulation equipment, and applicable requirements for these processes.

Monensin Process Description

Production of Monensin begins with the fermentation process in building C41, where the Monensin broth is produced in one or more of thirtytwo fermentation tanks. Microorganism growth begins in small bump tanks and full growth of the antibiotic product occurs in the large fermentation tanks. The process also includes additive tanks and holding tanks for storing feed material and seed tanks for experimental fermentation. Since the fermentation area is not dedicated to a certain product (i.e. Monensin or Narasin) and emissions do not vary from product to product, this area is not affected by the proposed modification to the Monensin granulation process.

Monensin production continues with the product recovery area in building C45, which is used to recover the antibiotics from fermentation broth. Product recovery introduces amyl alcohol to the process to promote the separation of the antibiotics from the broth using evaporators and centrifuges. The antibiotic product is then mixed with an inert material such as clay or rice hulls and dried. Dryers drive off the remaining residual fluids from the product.

VOC emissions may occur from evaporation, centrifugation, mixing, and drying. Particulate emissions may occur with inert material handling, mixing, drying, and product storage. In many cases, several pieces of VOC or particulate emitting equipment are connected in series and are vented only through the last piece of equipment. Since the modification to the Monensin granulation process in building C47 will debottleneck Monensin product recovery in building C45, a discussion of emissions from C45 is included in the Emission

Estimates section.

The Monensin finishing operations in building C47 consist of three processes: granulation, formulation or blending, and packaging or bagging. The granulation process is the portion of the operation that will be modified to increase Monensin production. The following paragraph provides a detailed description of the granulation process.

Dried intermediate Monensin is received from product recovery via a pneumatic conveying system. The pneumatic conveying system delivers the dried intermediate Monensin to a pellet mill and cooler, where the intermediate Monensin is formed into pellets, cut to desired length and then cooled. Occasionally, it may be necessary to add pelleting aid clay to the dried intermediate Monensin prior to the pelleting operation. After cooling the pellets, they are mechanically conveyed, under negative pressure, to the roller mills, where the pellets are crushed to a desired size. Occasionally, limestone is used to keep the rolls of the roller mill free of material build-up during processing. The crushed material is screened and large material is returned to the roller mill for further crushing. The sized material is routed to another screening process whereby the fines are removed from the product. The fines removed from the screening, mills and conveying equipment in the enclosed granulation system are collected and returned to the pellet mill for further processing.

After obtaining the desired granulated Monensin product, the material is mechanically conveyed, under negative pressure, to the blending process, where increments of granulated Monensin are blended to form homogenous lots for bagging. Finally, the finished product is transferred to the packaging equipment, where it is bagged for shipment. The fines removed from the blending and bagging equipment in the enclosed system are collected and returned to the pellet mill for further processing.

Narasin Process Description in Building C45

The production of Narasin occurs in the same manner as described for Monensin. Since this process is not being modified, a detailed description is not given here.

Proposed Modification

Currently, the production of Monensin is bottlenecked by the granulation process in building C47. Lilly proposes to modify this process to allow increased production of Monensin. The modification will consist of the following new equipment in building C47:

- Pelletizer/Pellet Cooler (PEL430/PC430) that will replace an existing pellet mill in the pellet mill/pellet cooler, and vent to an existing fabric filter (VS430A);
- Addition of new material handling equipment and Hopper (H431) that will exhaust to a new fabric filter (VS431);
- Addition of a new mill line (including material handling equipment and dust collector) that includes the following emission units:
  - Tote Bag Dump Station (DS470)
  - Drag Conveyor (COD480)
  - Drag Conveyor (COD481)
  - Drag Conveyor (COD490)
  - Drag Conveyor (COD491)

- Screener (SCR490)
- Screener (SCR491)
- Roller Mill (RM480)
- Roller Mill (RM481)
- Dust Collection Baghouse (VS480)

- Two Screeners (SCR450 and SCR451) that will replace existing screeners, and vent to an existing dust collector (VS460).
- Two Roller Mills (RM440 and RM440A) that will replace existing roller mills, and vent to an existing dust collector (VS470).

The increased capacities will be realized by changing three things in the granulation process:

4) Splitting the intermediate Monensin and recycled fines into separate flows into the pellet mill;
5) Replacing the existing pellet mill with one capable of handling increased capacity; and
6) Splitting the flow from the pellet mill into two milling and screening operations.

Currently, these operations serve as the bottleneck for Monensin production. After the proposed project, the bottleneck for Monensin production will be the transfer of material from building C45 to building C47.

Emission Estimates

Emissions associated with this project include volatile organic compounds (VOC) and particulate matter (PM-10). For purposes of this application, all particulate matter emissions are assumed to be PM-10. Emissions result from a combination of existing and new/modified emission units. This application covers the following sources of potential emissions:

- VOC emissions from the Monensin finishing process in building C-47;
- VOC emissions from the Narasin finishing process in building C-47;
- VOC emissions occuring as the result of debottle necking in building C-45;
- PM-10 emissions from new/modified equipment in the Monensin finishing process (including an analysis of any emissions increases associated with debottle necking).

Potential emission increases associated with this project are discussed in greater detail by pollutant below.

<u>Building C47 VOC Emissions from Monensin and Narasin Finishing Processes</u>

VOC emissions occur in the Monensin and Narasin finishing processes as the result of amyl alcohol that is released during the course of material handling, processing, and packaging. This application includes a quantification of VOC emissions from all operations in the Monensin and Narasin finishing processes, which were not evaluated in earlier modifications and permit applications. Emission estimates are based upon the existing equipment configuration for Narasin since no modifications to the Narasin process are proposed. Monensin potential emissions are based upon the configuration of the equipment that will exist following proposed equipment modifications.

To estimate VOC emissions from Monensin and Narasin unit operations in building C47, Lilly personnel conducted sampling of exhaust streams to quantify existing VOC emissions from each exhaust point. Based upon the VOC content in the air stream and the flow rate from each operation, emissions were quantified from each operation based upon the production rate at the time sampling occurred. Using this information, Lilly then estimated potential VOC emissions at full production rates (maximum hourly production rate for 8,760 hours per year).

Building C45 VOC Emissions from Monensin Product Recovery

Lilly used a mass balance equation to determine the VOC emissions increase from Building C45. Amyl alcohol is introduced into the Monensin product just before entering Building C45. Past actual purchases of amyl alcohol was used to determine the amount entering the building. There are four known points at which amyl alcohol can exit the building: C47 product transfer, COL201/219 effluent stream, EV108 effluent stream and HE002H drain line. Lilly used historical data for percent amyl alcohol in the product transfer, effluent streams and drain line and the actual product transfer rates to estimate the amount of amyl alcohol exiting the building at these known points. Any amyl alcohol not accounted for when balancing the amount entering and exiting the building at known points was assumed to be emissions to the atmosphere.

To estimate the future potential amount of amyl alcohol purchased, Lilly used historical data for usage of amyl alcohol per BKg of Monensin produced and then assumed a linear correlation to obtain future usage. Lilly then used historical data and potential transfer rates to estimate the amount that would exit the building from known, leaving any remaining amyl alcohol as VOC emissions from the building. Finally, Lilly compared the potential and past actual VOC emissions from Building C45 to estimate the net emissions increase.

Emission estimates for Monensin product recovery were performed comparing historic actual emissions (average of 1997 and 1998 emission rates) to future potential emission rates. Based upon this computation, the potential increase in VOC emissions from Monensin product recovery is determined to be 134 tons per year (744 tons per year future potential versus 610 tons per year average for 1997/1998).

Building C45	Process	Actual Emissions (t/yr)	Potential Emission Rate (t/yr)	Net emissions increase
	Monensin	610	744	134
	Total			417

* Future VOC emissions were calculated assuming BACT was not there. Because this VOC increase actually existed before the expansion in building C47, potential to emit is calculated before the control.

Building C47 PM/PM10 Emissions from Monensin Finishing Processes

Following the installation of the proposed equipment, the Monensin process will be capable of operating at a higher production rate than in the past. Consequently, Lilly has also considered the impact of emission increases in PM/PM-10 from the Monensin process in building C47. Building C45 does not contain any PM emitting equipement.

As a result of the installation of VOC control equipment for this process, a new dust collector will also be installed to further filter particlates in the exhaust stream prior to their entry into the VOC control unit. Since all building C47 PM-10 emission units (with the exception of small vacuum units) will vent through this system, this will result in additional control of PM-10 beyond existing control levels. In addition, the carbon adsorber itself will act as particulate filter and will provide additional control. The estimated PM and PM-10 emissions from the Monensin process following the change will be below significant levels, as defined under PSD regulations.

Particulate matter (PM) emissions from the Monensin finishing process were estimated based on process throughput and conservative engineering estimates for emission factors and control efficiency.

Emission Estimates

The following tables summarize the VOC and PM emissions from the Narasin and Monensin finishing operations as required by this permit. Many of the calculations performed to determine the PM and VOC emissions are considered confidential business information (CBI).

C47 VOC Fugitives from Carbon Adsorber Piping

Process	Component	Number	Emission Factor (lb/hr/component)	Percent VOC	Emissions (lbs/hr)	Hours of Service	Emissions (tpy)
Narasin	Pumps	2	0.108908	5	0.0109	8760	0.0477
	Valves in Liquid Service	22	0.015653	5	0.0172	8760	0.0754
	Valves in Gas Service	27	0.012346	5	0.0167	8760	0.0730
	Connectors/Flanges	44	0.00183	5	0.0040	8760	0.0176
Monensin	Pumps	2	0.108908	5	0.0109	8760	0.0477
	Valves in Liquid Service	28	0.015653	5	0.0219	8760	0.0960
	Valves in Gas Service	31	0.012346	5	0.0191	8760	0.0838
	Connectors/Flanges	58	0.00183	5	0.0053	8760	0.0232
TOTAL		214			0.11		0.46

C45 Monensin Actual VOC Emissions Losses

Year	Amyl Used (kg)	Amyl Loss C47 Product from D160/260	Amyl Loss Effluent Stream from COL201/219	Amyl Loss EV108 column	Amyl Loss HE002H drain line to the pad	Total Loss to Atmosphere	
		(Measured in Kg's)	(Measured in Kg's)	(Estimated in Kg's)	(Estimated in Kg's)	(Kg's)	(Tons)
1997	1,016,386	337,249	15,093	46,644	17,460	599,940	661
1998	962,045	400,223	17,152	13,748	22,462	508,460	560
Average	989,216	368,736	16,123	30,196	19,961	554,200	610

C45 Monensin Potential VOC Emissions Losses

Potential Amyl Used (kg)	Amyl Loss C47 Product from D160/260	Amyl Loss Effluent Stream from COL201/219	Amyl Loss in EV108 column	Amyl Loss In HE002H drain line To the pad	Total Loss to Atmosphere

	(Measured in Kg's)	(Measured in Kg's)	(Estimated in Kg's)	(Estimated in Kg's)	(Kg's)
1,488,636	709,560	21,668	53,178	28,908	675,322

C47 Monensin VOC Emission Estimates

Stream	Fan	Present Actual, Tons/yr	Future PTE, Lbs/hr	Future PTE, Tons/yr	Future Actual, Tons/yr	Comments
1	AC430A TAGGED CL0047BAC430A	155.90	61.36	210.34	180.7	
2	AC460 TAGGED CL0047BAC460	45.10	16.14	55.32	47.5	
3	AC480 TAGGED CL0047BAC480	0.0	16.14	55.32	47.5	NEW UNIT
4	AC430 TAGGED CL0047BAC430	13.10	4.54	15.58	13.4	
5	AC431 TAGGED CL0047BAC431	0.0	4.54	15.58	13.4	NEW UNIT
6	AC470 TAGGED CL0047BAC470	4.60	1.73	5.95	5.1	
7	AC435 TAGGED CL0047BAC435	0.15	0.00	0.00	0.0	WILL BE REMOVED
8	AC815A TAGGED CL0047EAC815A	27.59	10.87	37.25	32.0	
9	AC815B TAGGED CL0047EAC815B	8.20	3.23	11.07	9.5	
10	AC815C TAGGED CL0047EAC815C	7.80	3.07	10.53	9.0	
11	AC815D TAGGED CL0047EAC815D	0.01	0.00	0.01	0.0	Stream below outlet ppm
12	VS400 TAGGED CL0047BAC405	11.80	4.65	15.93	13.7	
13	AC410 TAGGED CL0047BAC410	7.80	3.07	10.53	9.0	
14	AC510 TAGGED CL0047BAC510	0.08	0.03	0.11	0.1	Stream below outlet ppm
	Total Emissions Before Control	282.1	129.4	443.5	381.1	
		281.9	129.3	443.4	381.0	Removing Streams 7, 11 and 14
		14.09	6.47	22.2	19.0	Assuming 95% Control
	Total Emissions @ 95% Control	14.33	6.50	**22.29**	19.15	Adding Streams 11 and 14
				23.53		Assuming 10 ppm Control
	Total Emissions @ 10 ppm outlet			**23.65**		Adding Streams 11 and 14

C47 Narasin VOC Emission Estimates

Stream	Fan	Present Actual, Tons/yr	PTE, Tons/yr	Future Actual, Tons/yr	Comments
1	AC007 TAGGED CL0047AC007	22.9	50.9	27.1	
2	AC010 TAGGED CL0047AC010	20.1	46.9	25.0	
3	AC018 TAGGED CL0047AC018	23.9	57.7	30.7	
4	AC017 TAGGED CL0047AC017	16.7	40.9	21.7	
5	AC180 TAGGED CL0047AC180	12.4	28.3	15.1	
6	AC002 TAGGED CL0047AC002	13.2	26.6	14.1	
7	AC004 TAGGED CL0047AC004	13.1	33.9	18.1	
8	VS001 TAGGED CL0047VS001	49.3	103.8	55.2	
9	AC182 TAGGED CL0047AC182	17.7	39.4	20.9	
10	AC183 TAGGED CL0047AC183	12.6	28.0	14.9	
11	AC170 TAGGED CL0047AC170	0.09	0.2	0.1	Stream is less than outlet ppm
12	AC013 TAGGED CL0047AC013	0.01	0.0	0.0	Stream is less than outlet ppm
	Total Emissions Before Control	202.0	456.6	242.9	
		201.9	456.4	242.8	Removing Streams 11 and 12
		10.10	22.8	12.1	Assuming 95% Control
	Total Emissions @ 95% Control	10.20	**23.04**	12.26	Adding Streams 11 and 12
			11.75		Assuming 10 ppm Control
	Total Emissions @ 10 ppm outlet		**11.98**		Adding Streams 11 and 12

Monensin Expansion PM Emissions Summary

Bldg	Stack/Vent ID	Past Actual Emissions (TPY)			Potential To Emit (TPY)	Net Increase (TPY)
		1997	1998	Average		
C47	PVC47AC11	0.05	0.07	0.06	0.1	0.04
	PVC47AC201	1.79	1.96	1.87	3.44	1.57
	PVC47AC400	5.68	5.57	5.63	0	-5.63
	PVC47TK11A	0.00	0.00	0.00	0	0.00
	PVC47TK11B	0.00	0.00	0.00	0	0.00
	PVC47BVS410	5.68	5.57	5.63	0	-5.63
	PVC47BVS420	0.01	0.01	0.01	0.02	0.01
	PVC47BAC430	5.70	5.60	5.65	0	-5.65
	PVC47BAC430A	0.07	0.07	0.07	0	-0.07
	PVCC47BAC431	NA	NA	NA	0	0.00
	PVC47BAC435	0.04	0.04	0.04	0	-0.04
	PVC47BAC460	0.01	0.01	0.01	0	-0.01
	PVC47BAC470	0.00	0.00	0.00	0	0.00
	PVC47AC480	NA	NA	NA	0	0.00
	PVC47BVS510	0.10	0.10	0.10	0.1	0.00
	PVC47AAC101A	0.02	0.04	0.03	0.06	0.03

	PVCH101	0.00	0.00	0.00	0	0.00
	PVC47AC102A	0.02	0.02	0.02	0.02	0.00
	PVCH102	0.00	0.00	0.00	0	0.00
	PVC47AC103A	0.11	0.14	0.13	0.21	0.08
	PVCH103	0.00	0.00	0.00	0	0.00
	PVC47EAC815A	0.99	0.99	0.99	0	-0.99
	PVC47EAC815B	2.05	2.05	2.05	0	-2.05
	PVC47EAC815C	0.34	0.34	0.34	0	-0.34
	PVC47EAC815D	0.29	0.29	0.29	0.67	0.38
C45	PVC45AC149	0.00	0.00	0.00	0.00	0.00
	PVC45AC150B	0.00	0.00	0.00	0.00	0.00
	PVC45AC172	0.00	0.00	0.00	0.00	0.00
	PVC45AC173	0.00	0.00	0.00	0.00	0.00
	PVC45AC174A	0.00	0.00	0.00	0.00	0.00
	PVC45AC174B	0.00	0.00	0.00	0.00	0.00
	PVC45AC156A	0.00	0.00	0.00	0.00	0.00
	PVC45AC17	0.05	0.05	0.05	0.05	0.00
TOTALS				**22.92**	**4.62**	**-18.30**

Emissions Summary

Building C47	Process	Actual Emissions (t/yr)	Potential Emission Rate (t/yr)	Net emissions increase
	Monensin	282	444	162
	Narasin	202	457	255
	Total			417

Building C45	Process	Actual Emissions (t/yr)	Potential Emission Rate (t/yr)	Net emissions increase
	Monensin	610	744	134
	Total	610	744	134

* Future VOC emissions were calculated assuming BACT was not there. Because this VOC increase actually existed before the expansion in building C47, potential to emit is calculated before the control. Therefore, this is subject to PSD review.

Net Emissions Increase due to modification

Process	PM/PM10	VOC
Building C45 Increase	Negligible	134
Building C47 Increase*	-18.3	417
Net Emissions Increase	-18.3	551
PSD Significance Threshold	25/15	40

Potential To Emit from Building C47 after the BACT implementation

Process	PM/PM10* (tpy)	VOC (tpy)
C47 Narasin	10.1	23.0
C47 Monensin	4.62	23.7

- PM/PM10 emissions were previously permitted under operation permit 83-09-91-0082, registration issued on June 5, 1984, and construction permit CP 165-2436.

APPENDIX B

Methodology to determine VOC emissions from the Monensin and Narasin finishing operations in building C47.

The first step in determining the cost of controlling VOC emissions is characterizing the emissions stream. The primary characteristics of any process emission stream are:

- Flow rate, Qe, the standard cubic feet per minute (scfm)
- VOC emissions rate, ER, tons per year (tpy)
- Emission stream temperature, Te, ^{0}F
- Relative humidity, R_{hum}, %
- VOC heat content, $H_{c,\ BTU/lb\ of\ pure\ VOC}$

Monensin Finishing operation stream characteristics have been computed based upon maximum annual production rate (using the physical constraints of the process) and air flow rates from all emission streams in the Monensin Finishing process that are anticipated to have an uncontrolled VOC emission rate above 5 ppmv. From this information for the Monensin Finishing process, the density of the VOC vapor, D_{VOC} is calculated from the ideal gas relationship:

D_{VOC} = PM/RTr

Where:

P = Reference pressure (1 atmosphere)

M = VOC molecular weight (88.2 lb/lb-mole)

R = Ideal gas constant ((0.7302)*(atm)(ft^3)/(^{0}R)*(lb-mole))

Tr = Reference temperature (530^{0}R)

For the amyl alcohol used in the Monesin process, D_{VOC} = 0.228 lb/ft^3

The VOC mass loading at the control device, M_{VOC} (lb/hr), is:

M_{VOC} = (2000 lb/t)ER/HRS

Where:

ER = VOC emission rate, tpy
(443.4 t/yr for Monesin Finishing process capacity)

HRS = Operating hours per year
(8760 hr/yr)

So, for VOC emissions from the Monesin Finishing process,

M_{VOC} = 101.2 lb VOC/hr

The emission stream VOC concentration, VOC_e (ppmv), is:

VOC_e = (M_{VOC} (1,000,000 ppmv))/((60 min/hr)*(D_{VOC} Q_e))

Where: Q_e = emission flow rate, scfm (39,252 scfm for all Monesin Finishing operation exhaust streams with VOC concentration above 5ppmv combined)

VOC_e = 188.5 ppmv

The emission stream heat content h_e (BTU/lb), is:

h'_e = ((deltaH_c M_{VOC}))/((60 min /hr)*(Q_e))

Where: deltaH_c = heat of combustion of Amyl Alcohol, BTU/lb (15,148 BTU/lb)

thus, for the combined Monensin Finishing operation exhaust,

h'_e = 0.651 Btu/scf

The emission stream heat content h_e (Btu/lb), is:

$h_e = h'_e / D_e$

Where: D_e = Emission stream density, lb/ft^3 (0.0739 lb//ft^3)

And, for the Monensin Finishing process:

h_e = 8.808 BTU/lb of exhaust gas

NARASIN STREAM CHARACRERIZATION

Similar to the Monensin Finishing process, the Narasin Finishing process is characterized based upon the following parameters:

- Flow rate, Q_e, standard cubic feet per minute (scfm)
- VOC emissions rate, ER, tons per year (tpy)
- Emission stream temperature, T_e, ^{0}F
- Relative humidity, R_{hum}, %
- VOC heat content, Hc, BTU/lb of pure VOC

Narasin Finishing operation stream characteristics have been computed based upon maximum annual production rate and air flow rates from all emission streams in the Narasin Finishing process that are anticipated to have an uncontrolled VOC emission rate above 5 ppmv. From this information, the density of the VOC vapor, D_{VOC} is calculated from the ideal gas relationship:

D_{VOC} = PM/RTr

Where:

P = reference pressure (1 atmosphere)
M = VOC molecular weight (88.2 lb/lb-mole)
R = Ideal gas constant ((0.7302)*(atm)(ft^3)/(^{0}R)*(lb-mole))
Tr = Reference temperature (530^{0}R)

For the amyl alcohol used in the Narasin process, D_{VOC} = 0.228 lb/ft^3

The VOC mass loading at the control device, Mvoc (lb/hr), is:

Mvoc = (2000 lb/ton)ER/HRS

Where;

ER = VOC emission rate, tpy
(456.4 t/yr for Narasin Finishing process at maximum capacity)

HRS = Operating hours per year
(8760 hr/yr)

So, for total VOC emissions from the Narasin Finishing process,

M_{VOC} = 104.2 lb VOC/hr

The emission stream VOC concentration, VOC_e (ppmv), is:

VOC_e = (M_{VOC} (1,000,000 ppmv))/((60 min/hr)*(D_{VOC} Q_e))

Where: Q_e = emission flow rate, scfm (19,610 scfm for all Narasin Finishing operation exhaust streams with uncontrolled VOC concentration above 5ppmv combined)

VOC_e = 388.4 ppmv

The emission stream heat content h'_e (BTU/scf), is:

h'_e = ((deltaH_c M_{VOC}))/((60 min /hr)*(Q_e))

Where: deltaH_c = heat of combustion of Amyl Alcohol, BTU/lb (15,148 BTU/lb)

Thus, for the combined Narasin Finishing operation exhaust,

h'_e = 1.342 Btu/scf

$h_e = h'_e / D_e$

Where: D_e = Emission stream density, lb/ft^3 (0.0739 lb//ft^3)

And, for the Narasin Finishing process:

h_e = 18.15 Btu/lb of exhaust gas

VOC emission estimates are summarized below:

Building C47	Process	Actual Emissions (t/yr)	Potential Emission Rate (t/yr)	Net emissions increase
	Monensin	282	444	162
	Narasin	202	457	255
Building C45	Monensin Product Recovery	630	744	134
	Total	1114	1645	551

BACT Analysis

BACT analysis for VOC has been conducted in accordance with USEPA A Top Down BACT Guidance. The RACT/BACT/LAER Clearinghouse and related state permits; and related federal permits issued by other state agencies were reviewed for control technology information.

VOC Control

Eli Lilly and Company, submitted an analysis of BACT for VOC emissions from Monensin and Narasin processes. The analysis evaluated recuperative thermal incineration, regenerative thermal incineration, recuperative catalytic incineration, regenerative catalytic incineration, flare, carbon adsorption, condensation, and carbon adsorption oxidation. There are two categories of controls for volatile organic compounds; destruction processes and reclamation processes. Destruction technologies reduce the VOC concentration by high temperature oxidation into carbon dioxide and water vapor. Reclamation is the capture of VOCs for reuse or disposal. The OAM also evaluated commercially available combinations of reclamation and destruction technologies.

Destruction Control Methods

The destruction of organic compounds usually requires temperatures ranging from 1,200 °F to 2,200 °F for direct thermal incinerators or 600 °F to 1,200 °F for catalytic systems. Combustion temperature depends on the chemical composition and the desired destruction efficiency. Carbon dioxide and water vapor are the typical products of complete combustion. Turbulent mixing and combustion chamber retention times of 0.5 to 1.0 seconds are needed to obtain high destruction efficiencies.
Fume incinerators typically need supplemental fuel. Concentrated VOC streams with high heat contents obviously require less supplementary fuel than more dilute streams. VOC streams sometimes have a heat content high enough to be self-sustaining, but a supplemental fuel firing rate equal to about 5% of the total incinerator heat input is usually needed to stabilize the burner flame. Natural gas is the most common fuel for VOC incinerators, but fuel oil is an option in some circumstances.

Combustion control technologies include: recuperative thermal incineration, regenerative thermal incineration, recuperative catalytic incineration, regenerative catalytic incineration and flares.

Recuperative Thermal Incineration

Thermal incineration is a common VOC emission control technique. Thermal incinerators are relatively straightforward to operate and maintain. In comparison to reclamation control Destruction efficiencies as high as 98% are possible, depending upon the inlet VOC concentration in the air stream. Recuperative thermal incineration recovers up to 70% of the heat of combustion using a gas-to-gas heat exchanger.

There are limits on the use of thermal incineration for VOC control. Thermal incineration is recommended for emission streams containing a minimum of 20 ppm of combustible VOCs but less than 25% of the lower explosive limit (LEL) of the pollutant. Concentrations above 25% of the LEL may require dilution or higher-cost explosion proof equipment to eliminate the explosive hazard.

Recuperative thermal incineration is a technically feasible VOC control technology for both the Monensin and Narasin Finishing processes. Lilly included an analysis of the economic viability of recuperative thermal incineration for exhaust streams from both of these processes.

Regenerative Thermal Incineration

Regenerative thermal incineration is similar in concept to recuperative thermal incineration. Both techniques use high temperature combustion to destroy organic pollutants. Regenerative incineration is suitable for the same inlet streams as recuperative incineration and has many of the same restrictions. The principal difference is the method of preheating the pollutant stream before the combustion chamber.

Regenerative thermal incineration is a technically feasible VOC control technology for the Monensin and Narasin Finishing processes. Lilly included an analysis of the economic viability of regenerative thermal incineration for both processes.

Recuperative Catalytic Incineration

The recuperative and regenerative processes described above are examples of direct incineration. In the direct processes, VOC destruction takes place in an atmosphere heated by the combustion products, at temperatures of 1,600 °F to 2,200 °F. The difference between catalytic and direct incineration is the presence of the catalyst in the combustion chamber. The catalyst lowers the activation energy of the oxidation reaction so combustion occurs at temperatures ranging from 600 °F to 1,200 °F. Similar to direct incineration, VOC destruction efficiencies of 98% are generally achievable, depending upon the inlet concentration of the air stream.

Recuperative catalytic incineration is a technically feasible VOC control technology for the Monensin and Narasin Finishing processes. Lilly included an analysis of the economic viability of recuperative catalytic incineration for both processes.

Regenerative Catalytic Incineration

Regenerative catalytic incineration is a technically feasible VOC control technology for the Monensin and Narasin Finishing processes. Lilly included an analysis of the economic viability of regenerative catalytic incineration for both of these processes. However, any cost analysis is based on a single cost estimate and the application of design considerations for recuperative systems. Regenerative catalytic incineration systems are uncommon in the United States. Only a few vendors offer regenerative catalytic incinerators. Most manufacturers of these incinerators are currently European companies. Two United States based companies, however, are working on prototype models of regenerative catalytic incinerators.

Flare

Flares are open flames used to combust emissions streams resulting from normal or upset process conditions. Flares are typically applied when the heat content of the emission stream is greater than 300 BTU/scf and when the value of any recovered product is negligible. Properly employed, the efficiency of a flare can be 98% or better.

The heat content of the air streams from the Monensin and Narasin Finishing processes are low in comparison to the desired heat content for flare design. As a result, this control option was not considered as a viable option in the BACT analysis.

Innovative Destruction Technologies

Review of the literature indicates that other technologies may destroy VOC pollutants. Biofilters, either outdoor piles similar to compost piles or sophisticated installations involving fixed film on granular activated carbon substrates, appear to work, although such systems are large and require considerable space. Systems applying ultraviolet radiation, either with a titanium dioxide catalyst or in combination with hydrogen peroxide, also show promise. None of these innovative applications are well documented, with little information on process costs. These novel technologies can not be considered commercially available.

Reclamation Control Methods

Organic compounds may be reclaimed by one of three possible methods; adsorption, absorption (scrubbing) or condensation. In general, the organic compounds are separated from the emission stream and reclaimed for reuse or disposal. Depending on the nature of the contaminant and the inlet concentration of the emission stream, recovery technologies can reach efficiencies of 98%.

Carbon Adsorption

Adsorption is a surface phenomenon where attraction between the carbon and the VOC molecules binds the pollutants to the carbon surface. Both carbon and VOC are chemically intact after adsorption. The VOCs may be removed, or desorbed, from the carbon and reclaimed or destroyed.

Carbon adsorption is a technically feasible VOC control technology for the Monensin and Narasin Finishing processes. The nature of amyl alcohol used in the manufacture of these products is such that recovered solvent could be reused.

Absorption

Absorption is a unit operation where components of a gas phase mixture (pollutants) are selectively transferred to a relatively nonvolatile liquid, usually water. Sometimes, organic liquids, such as mineral oil or non-volatile hydrocarbons, are suitable absorption solvents. The choice of solvent depends on cost and the solubility of the pollutant in the solvent.

Absorption was not considered to be a viable control option for either the Monensin or Narasin Finishing processes due to the relatively low VOC concentration in the air stream in comparison to applications that produce most effective control and the low amyl alcohol solubility in water.

Condensation

Condensation is the separation of VOCs from an emission stream through a phase change, by either increasing the system pressure or, more commonly, lowering the system temperature below the dew point of the VOC vapor. When condensers are used for air pollution control, they usually operate at the pressure of the emission stream, and typically require a refrigeration unit to obtain the temperature necessary to condense the VOCs from the emission stream.

Condensation is not a technically feasible VOC control technology for the Monensin and Narasin Finishing processes due to the very dilute air streams in comparison to typical applications of condensation control technology and the high boiling point of amyl alcohol. Lilly did not include an analysis of the economic viability of condensation in this study.

Combination Control Methods

Carbon Adsorption – Oxidation

The combination of carbon adsorption with recuperative thermal incineration is available from several vendors. This system concentrates the VOC stream by using carbon adsorption to remove low concentration VOCs in an emission stream and then uses a lower volume of hot air, commonly one-tenth the original flow, to desorb the pollutants. A recuperative incinerator for destroying pollutants in the concentrated stream is much smaller and has lower supplemental fuel requirements than an incinerator sized for the full emission stream volume.

The combination of carbon adsorption with thermal oxidation appears to be a feasible VOC control technology for the Monensin and Narasin Finishing processes. Lilly included an analysis of the economic viability of carbon adsorption - oxidation in this study.

Other Combined Control Techniques

Absorption systems can also be used to concentrate emission streams to reduce the size of destruction equipment. The concentration effect is not as extreme as with carbon adsorption, a concentrated exhaust stream one quarter the volume of the inlet stream seems to be the practical limit. Absorption concentrators are typically suited for batch processes or to equalize pollutant concentrations in a variable stream. The physical characteristics that drive the absorption of pollutants into a liquid also limit the opportunity to remove those pollutants from the liquid stream. Because of the the solubility characteristics of amyl alcohol being poor, this technology is not suitable for this process.

	Control Efficiency	Cost Effectiveness ($/ton Removed)
Recuperative Thermal Incineration	98%	$2,169
Regenerative Thermal Incineration	98%	$1,833
Recuperative Catalytic Incineration	98%	$2,224
Regenerative Catalytic Incineration	98%	$2,132
Carbon Adsorption	95%	$333
Carbon Adsorption/Oxidation	95%	$2,105

From the above table it is evident that the first best control technology is regenerative thermal incineration system, and the second best is carbon adsorption system.

The OAM reviewed the USEPA RACT/BACT/LAER Clearinghouse (RBLC) for entries for similar operations for Pharmaceutical Operations:Company	Process Description	Control Type	Control Efficiency
Dow Chemical	Reactor, Distallation, Crystallizer, Centrifuge, Vacuum Dryer, and Filter	Condenser followed by Wet Scrubber	90% for Isopropyl Alcohol and 95% for Ethyl Alcohol
ICN Pharmaceuticals	Drying Ovens (4)	Carbon Adsorption	Not Specified (BACT)
Kelco-Division of Merck, Inc.	Biogum Processing Line	Water Scrubbers	95% (BACT)
American Cyanamind Co.	Pharmaceutical Material Generation	Activated Carbon	90% (BACT)
Pfizer	Pharmaceutical Manufacturing Equipment	Regenerative Oil Absorbtion System	93% (BACT)
Pfizer	Coater/Dryer	Catalytic Oxidizer	95% (BACT)
Pfizer	Coater/Dryer/Dryer	Catalytic Oxidizer	95% (BACT)
Pfizer	Pharmaceutical Manufacturing Equipment	Surface Condensers	95% (RACT)
Eli Lilly & Company	Insulin Manufacturing	Low Temperature Vent Condensers	97% (BACT)
Upjohn	Expansion of HF Chemistry	Refrigerated Condenser	94.7% (BACT)
Upjohn	Filter, Pressure for Product Drying	2 Nitrogen Recycle Drying Systems	98% (LAER)

While all of the emission units listed in the above table fall under the heading of “pharmaceutical operations,” there is considerable variation in the type of process and the nature of the VOC emissions stream. None of the operations contained in this table are, in fact, similar to the Monensin or Narasin Finishing 0perations that are considered as a part of this evaluation.

Only two controls (the Upjohn pressure filter with a 98% efficient control system and the Lilly Insulin Manufacturing operation with controls at 97%) were notably higher than the control levels proposed for Monensin and Narasin Finishing processes. The Upjohn and Lilly Insulin processes both appear to have exhaust streams with much higher VOC concentrations than Monensin or Narasin Finishing operations, based upon the types of control measures employed for each. Therefore, these two controls were eliminated in selecting the BACT for this modification.

Energy, environmental, and economic factors are all to be considered as a part of a complete BACT analysis.

Environmental Impacts from Combustion Control Systems:

In comparing thermal and catalytic incineration systems to carbon adsorption, additional emissions will occur from byproducts of combustion in the control process. The quantity of emissions that will occur will be a function of the amount of natural gas needed to properly control emissions, and will vary by design. The predominant emissions from combustion will be nitrogen oxides and carbon monoxide, with lesser amounts of other criteria pollutants.

The catalytic or thermal incineration systems are estimated to produce anywhere from 1.5 to 12.7 tons per year of NOx emissions and 1.3 to 10.6 tons per year of CO emissions for the Monensin Finishing process. In the case of the regenerative thermal incineration system for the Monensin Finishing process discussed in Section 5.1 above, approximately 4.3 tons of nitrogen oxides and 3.6 tons per year of carbon monoxide per year would be created as a byproduct of combustion. Thus, even though 14.6 more tons of VOC would be controlled through the use of a regenerative thermal incineration system, this system will result in the creation of 4.3 tons per year of nitrogen oxide emissions and 3.6 tons per year of carbon monoxide emissions.

For the Narasin Finishing process, NOx emissions from combustion control systems are estimated to range from 0.3 to 5.9 tons per year, while CO emissions are estimated to range from 0.4 to 5.0 tons per year. The regenerative thermal incineration system (estimated to be the most cost effective) would create 1.7 tons of NOx and 1.5 tons per year of CO while controlling an additional 13.7 tons of VOCs.

Environmental Benefits of Carbon Adsorption

One of the most significant benefits of carbon adsorption is the fact that the recovered amyl alcohol can be reused directly in the process. For the Monensin Finishing process, this represents an estimated 116,000 gallons of amyl alcohol per year at maximum capacity, while the Narasin Finishing process would recover approximately 120,000 gallons of amyl alcohol per year at maximum capacity. While this represents a significant cost savings in terms of reduced expenditures for amyl alcohol, it also represents overall environmental benefits by reducing the amount of amyl alcohol that must be manufactured, transported, and distributed. Although carbon adsorption may have somewhat higher emissions at the plant site, it represents a tremendous benefit in regards to overall pollution prevention.

Energy Implications of Control Options

The incineration systems require the use of auxiliary fuel, in amounts varying from 18 cubic feet per minute to nearly 500 cubic feet per minute of natural gas. Estimated power consumption is somewhat higher for the carbon adsorption control option in comparison to thermal incineration options, but substantially lower than catalytic control alternatives. Based upon the analysis performed, carbon adsorption would have the lowest overall energy consumption of any of the six alternatives evaluated.

BACT for Monensin and Narasin Finishing processes

- Carbon adsorption allows to reuse recovered amyl alcohol, resulting in the recycling of over 235,000 gallons per year at maximum capacity for the Monensin and Narasin Finishing processes combined;
- Carbon adsorption results in the lowest control costs of the options considered to be feasible for these operations;
- The incremental cost of recovering additional control of VOC emissions through the use of the lowest cost combustion control technology (regenerative thermal incineration) is $47,354 per ton of VOC for the Monensin Finishing process and $49,303 per ton of VOC for the Narasin Finishing process;
- Lilly operates carbon adsorption units for other processes that are able to achieve similar levels of VOC control;
- Those options which would result in a slightly higher VOC control efficiency will, as a byproduct of combustion, produce emissions of NOx and other air pollutants that would not occur through the use of carbon adsorption;
- Those options which would result in a slightly higher VOC control efficiency will also consume more energy (in the form of natural gas consumption) than carbon adsorption;
- The RBLC does not have any entries for a process of this type with a control system with a greater efficiency. The only two entries in RBLC with control efficiencies greater than 95% are for processes that appear to have high concentration, low air flow rate exhaust streams.

The OAM has determined that carbon adsorption at a VOC removal efficiency of 95% or 10 ppm (when low VOC inlet concentration) outlet VOC concentration represents BACT for both the Monensin and Narasin finishing processes. Based upon this control system and potential emission estimates, potential emissions after control are estimated to be 23.7 tons per year for the Monensin finishing process and 23.0 tons per year for the Narasin finishing process.

Monensin Expansion Particulate Matter Emissions

Several equipment changes are proposed for the Monensin finishing process, including a new pellet mill, roller mill and associated equipment.

Following the installation of the proposed equipment, the Monensin process will be capable of operating at a higher production rate than in the past. Consequently, Lilly has also considered the impact of debottlenecked emission increases in PM-10 from the Monensin process in both building C47 and building C45.

As a result of the installation of VOC control equipment for this process, a new dust collector will also be installed to further filter particulates in the exhaust stream prior to their entry into the VOC control unit. Since all building C47 PM-10 emission units (with the exception of small vacuum units) will vent through this system, this will result in additional control of PM-10 beyond existing control levels. The estimated PM and PM-10 emissions from the Monensin process following the change will be below significant levels, as defined under PSD regulations.

Potential To Emit from Building C47 after the BACT implementation

Process	PM/PM10* (tpy)	VOC (tpy)

C47 Narasin	10.1	23.0
C47 Monensin	4.62	23.7
Total	14.72	46.7

* PM/PM10 emissions were previously permitted under operation permit 83-09-91-0082, registration issued on June 5, 1984, and construction permit CP 165-2436.

APPENDIX C

Air Quality Analysis

Introduction

Eli Lilly and Company (Lilly) has applied for a Prevention of Significant Deterioration (PSD) permit to modify its human medicines and animal health products facility near Clinton in Vermillion County, Indiana. The site is located at Universal Transverse Mercator (UTM) coordinates 466100.0 East and 4398100.0 North or 3 miles north of Clinton. The proposed modification would consist of a new pelletizer/pellet cooler, addition of new material handling equipment and hopper, new mill line, two screeners and two roller mills as well as capacity expansion for the animal health production of Monensin. Vermillion County is designated as attainment for the National Ambient Air Quality Standards. These standards for Nitrogen Dioxide (NO_2), Sulfur Dioxide (SO_2), Carbon Monoxide (CO) and Particulate Matter less than 10 microns (PM_{10}) are set by the United States Environmental Protection Agency (U.S. EPA) to protect the public health and welfare.

The permit application was received by the Office of Air Management (OAM) on May 19, 2000. This document provides OAM=s Air Quality Modeling Section's review of the PSD permit application including an air quality analysis performed by the OAM.

Air Quality Analysis Objectives

The OAM review of the air quality impact analysis portion of the permit application will accomplish the following objectives:

A. Establish which pollutants require an air quality analysis based on source emissions.
B. Determine the ambient air concentrations of the source's emissions.
C. Demonstrate that the source will not cause or contribute to a violation of the National Ambient Air Quality Standard (NAAQS).
D. Perform a brief qualitative analysis of the source's impact on general growth, soils, vegetation, endangered species and visibility in the impact area with emphasis on any Class I areas. The nearest Class I area is Kentucky's Mammoth Cave National Park, which is 291 kilometers (180 miles) from the Lilly site in Vermillion County, Indiana.

Summary

Lilly has applied for a PSD construction permit to modify its human medicines and animal health product facility near Clinton in Vermillion County, Indiana. The PSD application was prepared by Eli Lilly and Company. Vermillion County is currently designated as attainment for all criteria pollutants. A portion of Vermillion County was redesignated to attainment for Particulate Matter less than 10 microns in October 1997. Emission rates of Volatile Organic Compounds (VOCs) associated with the modification exceeded significant emission rates established in state and federal law, thus requiring air quality modeling. No Hazardous Air Pollutants will be emitted from the modification. There was no impact review conducted for the nearest Class I area, which is Mammoth Cave National Park in Kentucky. No Class I analysis is required if a source is located more than 100 kilometers (61 miles) from the nearest Class I area. An additional impact analysis on the surrounding area was conducted and no significant impact on economic growth, soils, vegetation, federal or state endangered species or visibility from Lilly is expected.

Part A - Pollutants Analyzed for Air Quality Impact

Indiana Administrative Code (326 IAC 2-2) PSD requirements apply in attainment and unclassifiable areas and require an air quality impact analysis of each regulated pollutant emitted in significant amounts by a new major stationary source or modification. Significant emission levels for each pollutant are defined in 326 IAC 2-2-1. VOCs and PM_{10} will be emitted from Lilly and an air quality analysis is required for VOCs, which exceeded its significant emission rates as shown in Table 1.

TABLE 1 - Lilly Significant Emission Rates (tons/yr)

Pollutant	Maximum Allowable Emissions	Significant Emission Rate
PM_{10}	14.7	15.0
VOC (ozone)	928.0	40.0

It should be noted that all emissions are based on the Best Available Control Technology (BACT) determination and other limitations resulting from the OAM review of the application.

Part B - Ozone Impact Analysis

OAM Three-Tiered Ozone Review

Ozone formation tends to occur in hot, sunny weather when NOx and VOC emissions photochemically react to form ozone. Many factors such as light winds, hot temperatures and sunlight are necessary for higher ozone production.

OAM incorporates a three-tiered approach in evaluating ozone impacts from a single source. The first step is to determine how VOC emissions from the new source compare to area-wide VOC emissions from Vermillion County as well as the surrounding counties of Fountain, Parke, Vigo and Warren. Results from this analysis show Lilly=s 928.0 tons/yr of VOC emissions from the modification would comprise 3.3% of the area-wide VOC emissions from point, area, onroad and nonroad mobile source and biogenic (naturally-occurring emissions from trees, grass and plants) emissions.

A second step is to review historical monitored data to determine ozone trends for an area and the applicable monitored value assigned to an area for designation determinations. This value is known as the design value for an area. The nearest ozone monitors within this region is Terre Haute monitor in Vigo County which is 27.5 kilometers or 17.0 miles to the south-southwest of the modification and is considered upwind. The design value for the Terre Haute monitor for the 1-hour ozone standard over the latest three years of monitoring data is 99 parts per billion (ppb). Wind rose analysis indicates that prevailing winds in the area occur from the southwest and west-southwest during the summer months of May through September when ozone formation is most likely to occur. Ozone impacts from the Lilly modification would likely fall north, northeast and east northeast of the facility.

A third step in evaluating the ozone impacts from a single source is to estimate the source individual impact through a screening procedure. The Reactive Plume Model-IV (RPM-IV) has been used in past air quality reviews to determine 1-hour ozone impacts from single VOC/NOx source emissions. RPM-IV is listed as an alternative model in Appendix B to the 40 Code of Federal Register Part 51, Appendix W AGuideline on Air Quality Models@. The model is unable to simulate all meteorological and chemistry conditions present during an ozone episode (period of days when ozone concentrations are high). Results from RPM-IV are an estimation of potential ozone impacts. Modeling for 1-hour ozone concentrations was conducted for June 18, 1994 (a high ozone day) to compare to the ozone National Ambient Air Quality Standard (NAAQS) limit. The maximum cell concentration of ozone for each time and distance specified was used to compare to the ambient ozone. OAM modeling results assumed the short-term emission rates of NO_2 and VOCs and is shown in Table 3. The impact (difference between the plume-injected and ambient modes) from Lilly was 1.2 ppb early in the plume development. All ambient plus plume-injected modes were below the NAAQS limit for ozone at every time period and every distance. No modeled 1-hour NAAQS violations of ozone occurred.

TABLE 3 – NAAQS Analysis for Ozone (June 18, 1994)

Time	**Distance**	**Ambient**	**Plume-Injected**	**Source Impact**
(hours)	(meters)	(ppb)	(ppb)	(ppb)
700.0	118.0	27.0	28.2	1.2
800.0	8500.0	50.3	51.0	0.7
900.0	12000.0	69.6	70.1	0.5
1000.0	14100.0	85.4	85.6	0.2
1100.0	20000.0	98.6	98.9	0.3
1200.0	27600.0	108	109	1
1300.0	33000.0	115	114	-1
1400.0	34600.0	118	116	-2
1500.0	38900.0	119	116	-3
1600.0	45300.0	120	115	-5
1700.0	60300.0	120	116	-4
1800.0	77500.0	120	116	-4
1900.0	90500.0	120	117	-4

Urban Airshed Model (UAM) analysis for regional ozone transport has been conducted by OAM as well as states surrounding Lake Michigan and various national organizations. UAM is regarded as a regional modeling tool used to develop ozone attainment demonstrations and determine NOx and VOC emission controls for a region. Transport of ozone and ozone-forming pollutants from upwind areas is evident and likely contributes to increased ozone concentrations in Vermillion County. Previous experience with this model has shown that the amount of additional VOC emissions from Lilly, a tiny fraction of the pollutants regionally, would not noticeably crease the ozone concentrations in the area.

From this three-tiered approach, ozone formation is a regional issue and the emissions from Lilly will represent a small fraction of NOx and VOC emissions in the area. Ozone contribution from Lilly emissions is expected to be minimal. Ozone historical data shows that the area monitors have design values below the ozone NAAQS of 120 ppb and the Lilly ozone impact based on the emissions and modeling will have minimal impact on ozone concentrations in the area.

Part C - Additional Impact Analysis

PSD regulations require additional impact analysis be conducted to show that impacts associated with the facility would not adversely affect the surrounding area. The Lilly PSD permit application provided an additional impact. This analysis included an impact on economic growth, soils, vegetation and visibility and is listed in summary description section of their application.

Economic Growth and Impact of Construction Analysis

A minimal construction workforce is expected and Lilly will employ up to 35 people selected from the local and regional area once the facility is operational. Secondary emissions are not expected to significantly impact the area as all roadways will be paved. Industrial and residential growth is predicted to have negligible impact in the area since it will be dispersed over a large area and new home construction is not expected to significantly increase. Any commercial growth, as a result of the modification, will occur at a gradual rate and will be accounted for in the background concentration measurements from air quality monitors. A minimal number of support facilities will be needed. There will be no adverse impact in the area due to industrial, residential or commercial growth.

Soils Analysis

Secondary NAAQS limits were established to protect general welfare, which includes soils, vegetation, animals and crops. Soil types in Vermillion County are of Russell-Fancastle Association of which is predominately Phanosols and Humic Grey soils (Soil Survey of Vermillion County, U.S. Department of Agriculture). The general landscape consists of Tipton Till Plain with gently rolling terrain (1816-1966 Natural Features of Indiana - Indiana Academy of Science). The soils will not be adversely affected by the modification.

Vegetation Analysis

Due to the agricultural nature of the land, crops in the Vermillion County area consist mainly of corn, wheat, and oats, soybeans and hay (1992 Agricultural Census for Vermillion County). The maximum modeled concentrations of Lilly for CO, NO_2, SO_2 and PM_{10} are well below the threshold limits necessary to have adverse impacts on surrounding vegetation such as autumn bent, nimblewill, barnyard grass, bishopscap and horsetail milkweed (Flora of Indiana - Charles Deam). Livestock in the county consist mainly of hogs, beef cows and sheep (1992 Agricultural Census for Vermillion County) and will not be adversely impacted from the modification. Trees in the area are mainly Beech, Maple, Oak and Hickory. These are hardy trees and no significant adverse impacts are expected.

Federal and State Endangered Species Analysis

Federally endangered or threatened species as listed in the U.S. Fish and Wildlife Service , Division of Endangered Species for Indiana include 12 species of mussels, 4 species of birds, 2 species of bat and butterflies and 1 species of snake. The mussels and birds listed are commonly found along major rivers and lakes while the bats are found near caves. The agricultural nature of the land overall has disturbed the habitats of the butterflies and snake and the modification is not expected to impact the area further.

Federally endangered or threatened plants as listed in the U.S. Fish and Wildlife Service, Division of Endangered Species for Indiana list two threatened and one endangered species of plants. The endangered plant is found along the sand dunes in northern Indiana while the two threatened species do not thrive along river basins. The proposed facility is not expected to impact the area further.

The state of Indiana=s list of endangered, special concern and extirpated nongame species, as listed in the Department of Natural Resources, Division of Fish and Wildlife, contains species of birds, amphibians, fish, mammals, mollusks and reptiles which may be found in the area of Lilly. However, the impacts are not expected to have any additional adverse effects on the habitats of the species than what has already occurred from the agricultural activity in the area.

Additional Analysis Conclusions

The nearest Class I area to the modification is the Mammoth Cave National Park located approximately 291 km southwest in Kentucky. Operation of the modification will not adversely affect the visibility at this Class I area. Lilly is located well beyond 100 kilometers (61 miles) from Mammoth Cave National Park and will not have significant impact on the Class I area. The results of the additional impact analysis conclude the Lilly's facility will have no adverse impact on economic growth, soils, vegetation, endangered or threatened species or visibility on any Class I area.

Indiana Department of Environmental Management
Office of Air Management

Addendum to the
Technical Support Document for New Construction and Operation

Source Name:	**Eli Lilly and Co.**
Source Location:	**10500 South State Road 63 Clinton, IN 47842**
County:	**Vermillion**
Significant Source Modification No.:	**165-12309-00009**
SIC Code:	**2834**
Permit Reviewer:	**Dr. T. P. Sinha**

On November 24, 2000, the Office of Air Management (OAM) had a notice published in the Daily Clintonian, Clinton, Indiana, stating that Eli Lilly and Co. had applied for a permit to construct and operate a Monensin and Narasin expansion project with two new carbon adsorbers to control VOC emissions at Clinton Laboratories. The notice also stated that OAM proposed to issue a permit for this installation and provided information on how the public could review the proposed permit and other documentation. Finally, the notice informed interested parties that there was a period of thirty (30) days to provide comments on whether or not this permit should be issued as proposed.

Note: The changes are crossed out, and the additions are bolded for emphasis.

The OAM has determined that the following additions, and modifications of Operation Conditions are necessary.

<u>SSM Letter</u>

1. Transfer bag house was added.

SCR491	Screener	Bag house VS480, Carbon Adsorber CA520	PVC59AC520
VS805	**Transfer Bag house**	**Carbon Adsorber CA520**	**PVC59AC520**
VS431	Transfer Bag house	Carbon Adsorber CA520	PVC59AC520

2. Typo was corrected

~~Mr.~~ **Ms.** Tobias

<u>SSM Permit</u>

1. Para. A2

Transfer bag house VS 805 was inadvertently left out.

VS102	Transfer Baghouse	N/A	PVC47EAC102A
VS805	**Transfer Baghouse**	**Carbon Adsorber CA520**	**PVC59AC520**
VS810A	Transfer Baghouse	Baghouse VS815C, Carbon Adsorber CA520	PVC59AC520

2. The permit will become effective immediately upon issuance as no comments from public or the applicant were received, and the changes made to the Significant Source Modification permit by IDEM, OAM are of administrative in nature. Therefore, Condition B2 was changed to be consistent with the rule.

B.2 Effective Date of the Permit [40CFR 124]

Pursuant to IC 13-15-5-3, 40 CFR 124.15(b), 40 CFR 124.19, and 40 CFR 124.20, this permit shall become effective ~~thirty three (33) days after the service of this decision, unless no comments requested a change in the draft permit, in which case the permit shall become effective~~ immediately upon issuance.

3. The PSD rule allows the suspension of construction for a continuous period of less than eighteen months rather than one year.

B.3 Revocation of Permits [326 IAC 2-2-8]

Pursuant to 326 IAC 2-2-8(a)(1), the Commissioner may revoke this approval if construction is not commenced within eighteen (18) months after receipt of this approval or if construction is suspended for a continuous period of ~~one (1) year~~ **eighteen (18) months** or more.

4. The preparation and maintenance of the preventive maintenance plan date has been changed from 90 days after approval to 90 days after commencement of construction, because it may not be possible to finalize the plan before the commencement of construction.

C.2 Preventive Maintenance Plan [326 IAC 2-7-5(1)(3) and (13)] [326 IAC 2-7-6(1) and (6)] [326 IAC 1-6-3]

(a) If required by specific condition(s) in Section D of this approval, the Permittee shall prepare and maintain Preventive Maintenance Plans (PMP) within ninety (90) days after ~~issuance of this approval~~ **commencement of construction**, including the following information on each facility:

5. The typo was corrected.

C.8 Maintenance of **Emission** Monitoring Equipment [326 IAC 2-7-5(3)(A)(iii)]

6. The new condition no. 9 was added.

C.9 Monitoring Methods [326 IAC 3] [40 CFR 60] [40 CFR 63]

Any monitoring or testing required by Section D of this permit shall be performed according to the provisions of 326 IAC 3, 40 CFR 60, Appendix A, 40 CFR 60 Appendix B, 40 CFR 63, or other approved methods as specified in this permit.

7. The record keeping requirement has been changed from 90 days of permit issuance to 90 days upon commencement of operation.

C.12 General Record Keeping Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-6]

(b) Unless otherwise specified in this permit, all record keeping requirements not already legally required shall be implemented within ninety (90) days ~~of permit issuance~~ **upon commencement of operation**.

8. The typo was corrected.

C.13 General Reporting Requirements [326 IAC 2-7-5(3)(C)] [326 IAC 2-1.1-11]

((a) The source shall submit ~~a~~ the attached

9. In this section only the maintenance of Narasin process equipment and control device is required.

D.1.4 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

~~A Preventive Maintenance Plan, in accordance with Section B - Preventive Maintenance Plan, of this permit, is required for the Monensin, and Narasin process equipment with baghouses, and air filters, and its control device, the carbon adsorber CA520.~~

A Preventive Maintenance Plan, in accordance with Section B - Preventive Maintenance Plan, of this permit, is required for the Monensin process equipment and its control device.

10. The ID of the equipment was added.

D.1.5 Temporary Operations

The Permittee may temporarily operate a new transfer operation **(VS805)** from product recovery in Building C45 to blending and bagging in Building C47E during the period of shutdown to modify

11. The typo was corrected. The second sentence of the paragraph (a) is not required.

D.1.8 Record ~~k~~ **K**eeping Requirement

(a) To document compliance with Condition D.1.2, the Permittee shall maintain records of the continuous monitoring of the carbon adsorber CA520. ~~In the event that a breakdown of the monitoring equipment occurs, a record shall be made of the times and reasons of the breakdown and efforts made to correct the problem.~~

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

12. The last sentence has been added to make it clear the requirement of C13(a).

D.1.9 Reporting Requirement [326 IAC 2-7-19]

A quarterly summary of excess emissions shall be submitted to the address listed in Section C - General Reporting Requirements, of this permit, within thirty (30) days after the end of the quarter being reported. The summary shall include the information specified in the reporting form located at the end of this permit**. This reporting requirement satisfies the requirement of C13(a).**

13. This preventive maintenance plan is only for Narasin process and its control equipment.

D.2.3 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

A Preventive Maintenance Plan, in accordance with Section B - Preventive Maintenance Plan, of this permit, is required for the ~~Monensin, and~~ Narasin process equipment and its control device.

14. The ID of the carbon adsorber was corrected.

D.2.6 Record Keeping Requirement

(a) To document compliance with Condition D.2.1, the Permittee shall maintain records of daily visible emission notations of the carbon adsorber ~~CA520~~ **CA190** stack exhaust.

(b) To document compliance with Condition D.2.2, the Permittee shall maintain records of the continuous monitoring of the carbon adsorber ~~CA520~~ **CA190**.

15. The last sentence has been added to make it clear the requirement of C13(a).

D.2.7 Reporting Requirement

A quarterly summary of excess emissions shall be submitted to the address listed in Section C - General Reporting Requirements, of this permit, within thirty (30) days after the end of the quarter being reported. The summary shall include the information specified in the reporting form located at the end of this permit. **This reporting requirement satisfies the requirement of C13(a).**

Affidavit of Construction

1. The transfer bag house VS-805 was added.

4. I hereby certify that Eli Lilly and Co., 10500 South State Road 63, Clinton, Indiana has constructed

BLDG	UNIT ID	UNIT DESCRIPTION	CONTROL DEVICE	STACK/VENT ID
C47B	COD480	Drag Conveyor	Bag house VS480, Carbon Adsorber CA520	PVC59AC520
	VS805	**Transfer Bag house**	**Carbon Adsorber CA520**	**PVC59AC520**
	VS431	Transfer Bag house	Carbon Adsorber CA520	PVC59AC520

In conformity with the requirements and intent of the significant source modification application received by the Office of Air Management on May 19, 2000 and as permitted pursuant to Significant Source Modification No. 165-12309-00009 issued on ________ ____________

Emissions Calculations

Eli Lilly and Company has submitted an application for Significant Source Modification permit for VOC emissions from the finishing operations (C47) and to obtain the necessary approval for capacity expansion to the animal health production of Monensin.

Eli Lilly and Company (Lilly) is a research-based corporation which develops, manufactures, and markets human medicines and animal health products. Human medicines and animal health products are manufactured at Lilly's Clinton Laboratories.

Clinton Labs' animal health production consists of fermentation in building C41, product recovery in building C45 and finishing operation in building C47. Narasin and Monensin are animal health antibiotics produced at Clinton Labs, which are manufactured in these processes.

The animal health production operations begin with the non-dedicated fermentation process in building C41, which has the capability of producing any of the three animal health products made at Clinton Labs.

The next step in the process is product recovery in building C45 where the antibiotic, either Narasin or Monensin, is recovered from the fermentation broth. Product recovery involves separation of the antibiotics from the broth with evaporators and centrifuges, using amyl alcohol to drive the extraction. The antibiotic is then mixed with an inert material such as clay or rice hulls to obtain desired potency. The last step is drying the product to drive off any remaining residual fluids.

The dried product is then sent to finishing in building C47, which involves three basic stages: granulation, formulation, and packaging. Generally, the dry product is formed into pellets or noodles, crushed into finer sizes by rollermills or hammermills, screened into acceptable sizes and packaged into tote bags or smaller bags.

The above process has particulate matter emissions associated with product drying, milling, and handling, as well as VOC emissions associated with the use and loss of amyl alcohol.

The existing processes have been permitted by IDEM as follows:

Permit Number	Issue Date	Process Permitted
83-09-91-0082 (operation permit renewal)	December 8, 1987	Original Product Recovery (C45) and Finishing (C47) operations for Monensin, Narasin and Tylosin
Registration (no number)	June 5, 1984	Monensin Granulation (C47B)
CP 165-1966	March 18, 1991	Narasin Product Recovery (C45A)
CP 165-2436	August 31, 1992	Monensin Blending (C47E)
CP 165-3493 (registration)	June 20, 1994	Tank Farm (C45)

Lilly has historically used a mass balance equation to determine the loss of amyl alcohol during product recovery. It has been assumed that essentially all amyl alcohol emissions occur in the product recovery process and that by the point that dried product is transferred from in building C45 to the finishing process in building C47, the material is void of any amyl alcohol. However, as Lilly evaluated modifying the Monensin granulation equipment in building C47, Lilly determined, using a new analytical method, that a substantial amount of amyl alcohol can remain in the dried intermediate product, resulting in significant VOC emissions during the finishing operations in building C47. These emissions have always been reported as part of the annual emissions statement, but have previously been associated with fugitive emissions from in building C45. Therefore, the existing permits for Narasin and Monensin granulation and blending have not accounted for the appropriate amount of VOC emissions from these pieces of equipment.

The following sections explain the proposed modification to the Monensin granulation process, the emissions estimates from the existing and proposed Monensin and Narasin granulation equipment, and applicable requirements for these processes.

Process Descriptions

Monensin Process Description

Production of Monensin begins with the fermentation process in building C41, where the Monensin broth is produced in one or more of thirty-two fermentation tanks. Microorganism growth begins in small bump tanks and full growth of the antibiotic product occurs in the large fermentation tanks. The process also includes additive tanks and holding tanks for storing feed material and seed tanks for experimental fermentation. Since the fermentation area is not dedicated to a certain product (i.e. Monensin or Narasin) and emissions do not vary from product to product, this area is not affected by the proposed modification to the Monensin granulation process.

Monensin production continues with the product recovery area in building C45, which is used to recover the antibiotics from fermentation broth. Product recovery introduces amyl alcohol to the process to promote the separation of the antibiotics from the broth using evaporators and centrifuges. The antibiotic product is then mixed with an inert material such as clay or rice hulls and dried. Dryers drive off the remaining residual fluids from the product.

VOC emissions may occur from evaporation, centrifugation, mixing, and drying. Particulate emissions may occur with inert material handling, mixing, drying, and product storage. In many cases, several pieces of VOC or particulate emitting equipment are connected in series and are vented only through the last piece of equipment. Since the modification to the Monensin granulation process in building C47 will debottleneck Monensin product recovery in building C45, a discussion of emissions from C45 is included in the Emission Estimates section.

The Monensin finishing operations in building C47 consist of three processes: granulation, formulation or blending, and packaging or bagging. The granulation process is the portion of the operation that will be modified to increase Monensin production. The following paragraph provides a detailed description of the granulation process.

Dried intermediate Monensin is received from product recovery via a pneumatic conveying system. The pneumatic conveying system delivers the dried intermediate Monensin to a pellet mill and cooler, where the intermediate Monensin is formed into pellets, cut to desired length and then cooled. Occasionally, it may be necessary to add pelleting aid clay to the dried intermediate Monensin prior to the pelleting operation. After cooling the pellets, they are mechanically conveyed, under negative pressure, to the roller mills, where the pellets are crushed to a desired size. Occasionally, limestone is used to keep the rolls of the roller mill free of material build-up during processing. The crushed material is screened and large material is returned to the roller mill for further crushing. The sized material is routed to another screening process whereby the fines are removed from the product. The fines removed from the screening, mills and conveying equipment in the enclosed granulation system are collected and returned to the pellet mill for further processing.

After obtaining the desired granulated Monensin product, the material is mechanically conveyed, under negative pressure, to the blending process, where increments of granulated Monensin are blended to form homogenous lots for bagging. Finally, the finished product is transferred to the packaging equipment, where it is bagged for shipment. The fines removed from the blending and bagging equipment in the enclosed system are collected and returned to the pellet mill for further processing.

Proposed Modification

Currently, the production of Monensin is bottlenecked by the granulation process in building C47. Lilly proposes to modify this process to allow increased production of Monensin. The modification will consist of the following new equipment in building C47:

- Pelletizer/Pellet Cooler (PEL430/PC430) that will replace an existing pellet mill in the pellet mill/pellet cooler, and vent to an existing fabric filter (VS430A);
- Addition of new material handling equipment and Hopper (H431) that will exhaust to a new fabric filter (VS431);
- Addition of a new mill line (including material handling equipment and dust collector) that includes the following emission units:
  - Tote Bag Dump Station (DS470)
  - Drag Conveyor (COD480)
  - Drag Conveyor (COD481)
  - Drag Conveyor (COD490)
  - Drag Conveyor (COD491)
  - Screener (SCR490)
  - Screener (SCR491)
  - Roller Mill (RM480)
  - Roller Mill (RM481)
  - Dust Collection Baghouse (VS480)
- Two Screeners (SCR450 and SCR451) that will replace existing screeners, and vent to an existing dust collector (VS460).
- Two Roller Mills (RM440 and RM440A) that will replace existing roller mills, and vent to an existing dust collector (VS470).

The increased capacities will be realized by changing three things in the granulation process:

1) Splitting the intermediate Monensin and recycled fines into separate flows into the pellet mill;
2) Replacing the existing pellet mill with one capable of handling increased capacity; and
3) Splitting the flow from the pellet mill into two milling and screening operations.

Currently, these operations serve as the bottleneck for Monensin production. After the proposed project, the bottleneck for Monensin production will be the transfer of material from building C45 to building C47.

Emission Estimates

Emissions associated with this project include volatile organic compounds (VOC) and particulate matter (PM-10). For purposes of this application, all particulate matter emissions are assumed to be PM-10. Emissions result from a combination of existing and new/modified emission units. This application covers the following sources of potential emissions:

- VOC emissions from the Monensin finishing process in building C-47;
- VOC emissions from the Narasin finishing process in building C-47;
- VOC emissions occuring as the result of debottlenecking in building C-45;
- PM-10 emissions from new/modified equipment in the Monensin finishing process (including an analysis of any emissions increases associated with debottlenecking).

Potential emission increases associated with this project are discussed in greater detail by pollutant below.

Building C47 VOC Emissions from Monensin and Narasin Finishing Processes

VOC emissions occur in the Monensin and Narasin finishing processes as the result of amyl alcohol that is released during the course of material handling, processing, and packaging. This application includes a quantification of VOC emissions from all operations in the Monensin and Narasin finishing processes, which were not evaluated in earlier modifications and permit applications. Emission estimates are based upon the existing equipment configuration for Narasin since no modifications to the Narasin process are proposed. Monensin potential emissions are based upon the configuration of the equipment that will exist following proposed equipment modifications.

To estimate VOC emissions from Monensin and Narasin unit operations in building C47, Lilly personnel conducted sampling of exhaust streams to quantify existing VOC emissions from each exhaust point. Based upon the VOC content in the air stream and the flow rate from each operation, emissions were quantified from each operation based upon the production rate at the time sampling occurred. Using this information, Lilly then estimated potential VOC emissions at full production rates (maximum hourly production rate for 8,760 hours per year).

Methodology to determine VOC emissions from the Monensin and Narasin finishing operations in building C47.

The first step in determining the cost of controlling VOC emissions is characterizing the emissions stream. The primary characteristics of any process emission stream are:

- Flow rate, Qe, the standard cubic feet per minute (scfm)
- VOC emissions rate, ER, tons per year (tpy)
- Emission stream temperature, Te, ^{0}F
- Relative humidity, R_{hum}, %
- VOC heat content, $H_{c,\ BTU/lb\ of\ pure\ VOC}$

Monensin Finishing operation stream characteristics have been computed based upon maximum annual production rate (using the physical constraints of the process) and air flow rates from all emission streams in the Monensin Finishing process that are anticipated to have an uncontrolled VOC emission rate above 5 ppmv. From this information for the Monensin Finishing process, the density of the VOC vapor, D_{VOC} is calculated from the ideal gas relationship:

$$D_{VOC} = PM/RTr$$

Where:

P = Reference pressure (1 atmosphere)

M = VOC molecular weight (88.2 lb/lb-mole)

R = Ideal gas constant ((0.7302)*(atm)(ft^3)/(^0R)*(lb-mole))

Tr = Reference temperature (530^{0}R)

For the amyl alcohol used in the Monesin process, D_{VOC} = 0.228 lb/ft^3

The VOC mass loading at the control device, M_{VOC} (lb/hr), is:

M_{VOC} = (2000 lb/t)ER/HRS

Where:

ER = VOC emission rate, tpy
(443.4 t/yr for Monesin Finishing process capacity)

HRS = Operating hours per year
(8760 hr/yr)

So, for VOC emissions from the Monesin Finishing process,

M_{VOC} = 101.2 lb VOC/hr

The emission stream VOC concentration, VOC_e (ppmv), is:

VOC_e = (M_{VOC} (1,000,000 ppmv))/((60 min/hr)*(D_{VOC} Q_e))

Where: Q_e = emission flow rate, scfm (39,252 scfm for all Monesin Finishing operation exhaust streams with VOC concentration above 5ppmv combined)

VOC_e = 188.5 ppmv

The emission stream heat content h_e (BTU/lb), is:

h'_e = ((deltaH_c M_{VOC}))/((60 min /hr)*(Q_e))

Where: deltaH_c = heat of combustion of Amyl Alcohol, BTU/lb (15,148 BTU/lb)

thus, for the combined Monensin Finishing operation exhaust,

h'_e = 0.651 Btu/scf

The emission stream heat content h_e (Btu/lb), is:

$h_e = h'_e / D_e$

Where: D_e = Emission stream density, lb/ft^3 (0.0739 lb//ft^3)

And, for the Monensin Finishing process:

h_e = 8.808 BTU/lb of exhaust gas

NARASIN STREAM CHARACRERIZATION

Similar to the Monensin Finishing process, the Narasin Finishing process is characterized based upon the following parameters:

- Flow rate, Q_e, standard cubic feet per minute (scfm)
- VOC emissions rate, ER, tons per year (tpy)
- Emission stream temperature, T_e, ^0F
- Relative humidity, R_{hum}, %
- VOC heat content, Hc, BTU/lb of pure VOC

Narasin Finishing operation stream characteristics have been computed based upon maximum annual production rate and air flow rates from all emission streams in the Narasin Finishing process that are anticipated to have an uncontrolled VOC emission rate above 5 ppmv. From this information, the density of the VOC vapor, D_{VOC} is calculated from the ideal gas relationship:

$$D_{VOC} = PM/RTr$$

Where:

P = reference pressure (1 atmosphere)
M = VOC molecular weight (88.2 lb/lb-mole)
R = Ideal gas constant ((0.7302)*(atm)(ft^3)/(^{0}R)*(lb-mole))
Tr = Reference temperature (530^{0}R)

For the amyl alcohol used in the Narasin process, D_{VOC} = 0.228 lb/ft^3

The VOC mass loading at the control device, Mvoc (lb/hr), is:

$$Mvoc = (2000\ lb/ton)ER/HRS$$

Where;

ER = VOC emission rate, tpy
(456.4 t/yr for Narasin Finishing process at maximum capacity)

HRS = Operating hours per year
(8760 hr/yr)

So, for total VOC emissions from the Narasin Finishing process,

$$M_{VOC} = 104.2\ lb\ VOC/hr$$

The emission stream VOC concentration, VOC_e (ppmv), is:

$$VOC_e = (M_{VOC}\,(1{,}000{,}000\ ppmv))/((60\ min/hr)*(D_{VOC}\,Q_e))$$

Where: Q_e = emission flow rate, scfm (19,610 scfm for all Narasin Finishing operation exhaust streams with uncontrolled VOC concentration above 5ppmv combined)

VOC_e = 388.4 ppmv

The emission stream heat content h'_e (BTU/scf), is:

$h'_e = ((deltaH_c M_{VOC}))/((60 \text{ min /hr})*(Q_e))$

Where: $deltaH_c$ = heat of combustion of Amyl Alcohol, BTU/lb (15,148 BTU/lb)

Thus, for the combined Narasin Finishing operation exhaust,

$h'_e = 1.342$ Btu/scf

$h_e = h'_e / D_e$

Where: D_e = Emission stream density, lb/ft^3 (0.0739 lb//ft^3)

And, for the Narasin Finishing process:

$h_e = 18.15$ Btu/lb of exhaust gas

VOC emission estimates are summarized below:

Building C47	Process	Actual Emissions (t/yr)	Potential Emission Rate (t/yr)	Net emissions increase
	Monensin	282	444	162
	Narasin	202	457	255
	Total			417

BACT Analysis

BACT analysis for VOC has been conducted in accordance with USEPA A Top Down BACT Guidance. The RACT/BACT/LAER Clearinghouse and related state permits; and related federal permits issued by other state agencies were reviewed for control technology information.

VOC Control

Eli Lilly and Company, submitted an analysis of BACT for VOC emissions from Monensin and Narasin processes. The analysis evaluated recuperative thermal incineration, regenerative thermal incineration, recuperative catalytic incineration, regenerative catalytic incineration, flare, carbon adsorption, condensation, and carbon adsorption oxidation. There are two categories of controls for volatile organic compounds; destruction processes and reclamation processes. Destruction technologies reduce the VOC concentration by high temperature oxidation into carbon dioxide and water vapor. Reclamation is the capture of VOCs for reuse or disposal. The OAM also evaluated commercially available combinations of reclamation and destruction technologies.

Destruction Control Methods

The destruction of organic compounds usually requires temperatures ranging from 1,200 °F to 2,200 °F for direct thermal incinerators or 600 °F to 1,200 °F for catalytic systems. Combustion temperature depends on the chemical composition and the desired destruction efficiency. Carbon dioxide and water vapor are the typical products of complete combustion. Turbulent mixing and combustion chamber retention times of 0.5 to 1.0 seconds are needed to obtain high destruction efficiencies.

Fume incinerators typically need supplemental fuel. Concentrated VOC streams with high heat contents obviously require less supplementary fuel than more dilute streams. VOC streams sometimes have a heat content high enough to be self-sustaining, but a supplemental fuel firing rate equal to about 5% of the total incinerator heat input is usually needed to stabilize the burner flame. Natural gas is the most common fuel for VOC incinerators, but fuel oil is an option in some circumstances.

Combustion control technologies include: recuperative thermal incineration, regenerative thermal incineration, recuperative catalytic incineration, regenerative catalytic incineration and flares.

Recuperative Thermal Incineration

Thermal incineration is a common VOC emission control technique. Thermal incinerators are relatively straightforward to operate and maintain. In comparison to reclamation control Destruction efficiencies as high as 98% are possible, depending upon the inlet VOC concentration in the air stream. Recuperative thermal incineration recovers up to 70% of the heat of combustion using a gas-to-gas heat exchanger.

There are limits on the use of thermal incineration for VOC control. Thermal incineration is recommended for emission streams containing a minimum of 20 ppm of combustible VOCs but less than 25% of the lower explosive limit (LEL) of the pollutant. Concentrations above 25% of the LEL may require dilution or higher-cost explosion proof equipment to eliminate the explosive hazard.

Recuperative thermal incineration is a technically feasible VOC control technology for both the Monensin and Narasin Finishing processes. Lilly included an analysis of the economic viability of recuperative thermal incineration for exhaust streams from both of these processes.

Regenerative Thermal Incineration

Regenerative thermal incineration is similar in concept to recuperative thermal incineration. Both techniques use high temperature combustion to destroy organic pollutants. Regenerative incineration is suitable for the same inlet streams as recuperative incineration and has many of the same restrictions. The principal difference is the method of preheating the pollutant stream before the combustion chamber.

Regenerative thermal incineration is a technically feasible VOC control technology for the Monensin and Narasin Finishing processes. Lilly included an analysis of the economic viability of regenerative thermal incineration for both processes.

Recuperative Catalytic Incineration

The recuperative and regenerative processes described above are examples of direct incineration. In the direct processes, VOC destruction takes place in an atmosphere heated by the combustion products, at temperatures of 1,600 °F to 2,200 °F. The difference between catalytic and direct incineration is the presence of the catalyst in the combustion chamber. The catalyst lowers the activation energy of the oxidation reaction so combustion occurs at temperatures ranging from 600 °F to 1,200 °F. Similar to direct incineration, VOC destruction efficiencies of 98% are generally achievable, depending upon the inlet concentration of the air stream.

Recuperative catalytic incineration is a technically feasible VOC control technology for the Monensin and Narasin Finishing processes. Lilly included an analysis of the economic viability of recuperative catalytic incineration for both processes.

Regenerative Catalytic Incineration

Regenerative catalytic incineration is a technically feasible VOC control technology for the Monensin and Narasin Finishing processes. Lilly included an analysis of the economic viability of regenerative catalytic incineration for both of these processes. However, any cost analysis is based on a single cost estimate and the application of design considerations for recuperative systems. Regenerative catalytic incineration systems are uncommon in the United States. Only a few vendors offer regenerative catalytic incinerators. Most manufacturers of these incinerators are currently European companies. Two United States based companies, however, are working on prototype models of regenerative catalytic incinerators.

Flare

Flares are open flames used to combust emissions streams resulting from normal or upset process conditions. Flares are typically applied when the heat content of the emission stream is greater than 300 BTU/scf and when the value of any recovered product is negligible. Properly employed, the efficiency of a flare can be 98% or better.

The heat content of the air streams from the Monensin and Narasin Finishing processes are low in comparison to the desired heat content for flare design. As a result, this control option was not considered as a viable option in the BACT analysis.

Innovative Destruction Technologies

Review of the literature indicates that other technologies may destroy VOC pollutants. Biofilters, either outdoor piles similar to compost piles or sophisticated installations involving fixed film on granular activated carbon substrates, appear to work, although such systems are large and require considerable space. Systems applying ultraviolet radiation, either with a titanium dioxide catalyst or in combination with hydrogen peroxide, also show promise. None of these innovative applications are well documented, with little information on process costs. These novel technologies can not be considered commercially available.

Reclamation Control Methods

Organic compounds may be reclaimed by one of three possible methods; adsorption, absorption (scrubbing) or condensation. In general, the organic compounds are separated from the emission stream and reclaimed for reuse or disposal. Depending on the nature of the contaminant and the inlet concentration of the emission stream, recovery technologies can reach efficiencies of 98%.

Carbon Adsorption

Adsorption is a surface phenomenon where attraction between the carbon and the VOC molecules binds the pollutants to the carbon surface. Both carbon and VOC are chemically intact after adsorption. The VOCs may be removed, or desorbed, from the carbon and reclaimed or destroyed.

Carbon adsorption is a technically feasible VOC control technology for the Monensin and Narasin Finishing processes. The nature of amyl alcohol used in the manufacture of these products is such that recovered solvent could be reused.

Absorption

Absorption is a unit operation where components of a gas phase mixture (pollutants) are selectively transferred to a relatively nonvolatile liquid, usually water. Sometimes, organic liquids, such as mineral oil or non-volatile hydrocarbons, are suitable absorption solvents. The choice of solvent depends on cost and the solubility of the pollutant in the solvent.

Absorption was not considered to be a viable control option for either the Monensin or Narasin Finishing processes due to the relatively low VOC concentration in the air stream in comparison to applications that produce most effective control and the low amyl alcohol solubility in water.

Condensation

Condensation is the separation of VOCs from an emission stream through a phase change, by either increasing the system pressure or, more commonly, lowering the system temperature below the dew point of the VOC vapor. When condensers are used for air pollution control, they usually operate at the pressure of the emission stream, and typically require a refrigeration unit to obtain the temperature necessary to condense the VOCs from the emission stream.

Condensation is not a technically feasible VOC control technology for the Monensin and Narasin Finishing processes due to the very dilute air streams in comparison to typical applications of condensation control technology and the high boiling point of amyl alcohol. Lilly did not include an analysis of the economic viability of condensation in this study.

Combination Control Methods

Carbon Adsorption – Oxidation

The combination of carbon adsorption with recuperative thermal incineration is available from several vendors. This system concentrates the VOC stream by using carbon adsorption to remove low concentration VOCs in an emission stream and then uses a lower volume of hot air, commonly one-tenth the original flow, to desorb the pollutants. A recuperative incinerator for destroying pollutants in the concentrated stream is much smaller and has lower supplemental fuel requirements than an incinerator sized for the full emission stream volume.

The combination of carbon adsorption with thermal oxidation appears to be a feasible VOC control technology for the Monensin and Narasin Finishing processes. Lilly included an analysis of the economic viability of carbon adsorption - oxidation in this study.

Other Combined Control Techniques

Absorption systems can also be used to concentrate emission streams to reduce the size of destruction equipment. The concentration effect is not as extreme as with carbon adsorption, a concentrated exhaust stream one quarter the volume of the inlet stream seems to be the practical limit. Absorption concentrators are typically suited for batch processes or to equalize pollutant concentrations in a variable stream. The physical characteristics that drive the absorption of pollutants into a liquid also limit the opportunity to remove those pollutants from the liquid stream. Because of the the solubility characteristics of amyl alcohol being poor, this technology is not suitable for this process.

	Control Efficiency	Cost Effectiveness ($/ton Removed)
Recuperative Thermal Incineration	98%	$2,169
Regenerative Thermal Incineration	98%	$1,833
Recuperative Catalytic Incineration	98%	$2,224
Regenerative Catalytic Incineration	98%	$2,132
Carbon Adsorption	95%	$333
Carbon Adsorption/Oxidation	95%	$2,105

From the above table it is evident that the first first best control technology is regenerative thermal incineration system, and the second best is carbon adsorption system.

The OAM reviewed the USEPA RACT/BACT/LAER Clearinghouse (RBLC) for entries for similar operations for Pharmaceutical Operations:Company	Process Description	Control Type	Control Efficiency
Dow Chemical	Reactor, Distallation, Crystallizer, Centrifuge, Vacuum Dryer, and Filter	Condenser followed by Wet Scrubber	90% for Isopropyl Alcohol and 95% for Ethyl Alcohol
ICN Pharmaceuticals	Drying Ovens (4)	Carbon Adsorption	Not Specified (BACT)
Kelco-Division of Merck, Inc.	Biogum Processing Line	Water Scrubbers	95% (BACT)
American Cyanamind Co.	Pharmaceutical Material Generation	Activated Carbon	90% (BACT)
Pfizer	Pharmaceutical Manufacturing Equipment	Regenerative Oil Absorbtion System	93% (BACT)
Pfizer	Coater/Dryer	Catalytic Oxidizer	95% (BACT)
Pfizer	Coater/Dryer/Dryer	Catalytic Oxidizer	95% (BACT)
Pfizer	Pharmaceutical Manufacturing Equipment	Surface Condensers	95% (RACT)
Eli Lilly & Company	Insulin Manufacturing	Low Temperature Vent Condensers	97% (BACT)
Upjohn	Expansion of HF Chemistry	Refrigerated Condenser	94.7% (BACT)
Upjohn	Filter, Pressure for Product Drying	2 Nitrogen Recycle Drying Systems	98% (LAER)

While all of the emission units listed in the above table fall under the heading of “pharmaceutical operations,” there is considerable variation in the type of process and the nature of the VOC emissions stream. None of the operations contained in this table are, in fact, similar to the Monensin or Narasin Finishing 0perations that are considered as a part of this evaluation.

Only two controls (the Upjohn pressure filter with a 98% efficient control system and the Lilly Insulin Manufacturing operation with controls at 97%) were notably higher than the control levels proposed for Monensin and Narasin Finishing processes. The Upjohn and Lilly Insulin processes both appear to have exhaust streams with much higher VOC concentrations than Monensin or Narasin Finishing operations, based upon the types of control measures employed for each. Therefore, these two controls were eliminated in selecting the BACT for this modification.

Energy, environmental, and economic factors are all to be considered as a part of a complete BACT analysis.

Environmental Impacts from Combustion Control Systems:

In comparing thermal and catalytic incineration systems to carbon adsorption, additional emissions will occur from byproducts of combustion in the control process. The quantity of emissions that will occur will be a function of the amount of natural gas needed to properly control emissions, and will vary by design. The predominant emissions from combustion will be nitrogen oxides and carbon monoxide, with lesser amounts of other criteria pollutants.

The catalytic or thermal incineration systems are estimated to produce anywhere from 1.5 to 12.7 tons per year of NOx emissions and 1.3 to 10.6 tons per year of CO emissions for the Monensin Finishing process. In the case of the regenerative thermal incineration system for the Monensin Finishing process discussed in Section 5.1 above, approximately 4.3 tons of nitrogen oxides and 3.6 tons per year of carbon monoxide per year would be created as a byproduct of combustion. Thus, even though 14.6 more tons of VOC would be controlled through the use of a regenerative thermal incineration system, this system will result in the creation of 4.3 tons per year of nitrogen oxide emissions and 3.6 tons per year of carbon monoxide emissions.

For the Narasin Finishing process, NOx emissions from combustion control systems are estimated to range from 0.3 to 5.9 tons per year, while CO emissions are estimated to range from 0.4 to 5.0 tons per year. The regenerative thermal incineration system (estimated to be the most cost effective) would create 1.7 tons of NOx and 1.5 tons per year of CO while controlling an additional 13.7 tons of VOCs.

Environmental Benefits of Carbon Adsorption

One of the most significant benefits of carbon adsorption is the fact that the recovered amyl alcohol can be reused directly in the process. For the Monensin Finishing process, this represents an estimated 116,000 gallons of amyl alcohol per year at maximum capacity, while the Narasin Finishing process would recover approximately 120,000 gallons of amyl alcohol per year at maximum capacity. While this represents a significant cost savings in terms of reduced expenditures for amyl alcohol, it also represents overall environmental benefits by reducing the amount of amyl alcohol that must be manufactured, transported, and distributed. Although carbon adsorption may have somewhat higher emissions at the plant site, it represents a tremendous benefit in regards to overall pollution prevention.

Energy Implications of Control Options

The incineration systems require the use of auxiliary fuel, in amounts varying from 18 cubic feet per minute to nearly 500 cubic feet per minute of natural gas. Estimated power consumption is somewhat higher for the carbon adsorption control option in comparison to thermal incineration options, but substantially lower than catalytic control alternatives. Based upon the analysis performed, carbon adsorption would have the lowest overall energy consumption of any of the six alternatives evaluated.

BACT for Monensin and Narasin Finishing processes

- Carbon adsorption allows to reuse recovered amyl alcohol, resulting in the recycling of over 235,000 gallons per year at maximum capacity for the Monensin and Narasin Finishing processes combined;
- Carbon adsorption results in the lowest control costs of the options considered to be feasible for these operations;
- The incremental cost of recovering additional control of VOC emissions through the use of the lowest cost combustion control technology (regenerative thermal incineration) is $47,354 per ton of VOC for the Monensin Finishing process and $49,303 per ton of VOC for the Narasin Finishing process;
- Lilly operates carbon adsorption units for other processes that are able to achieve similar levels of VOC control;
- Those options which would result in a slightly higher VOC control efficiency will, as a byproduct of combustion, produce emissions of NOx and other air pollutants that would not occur through the use of carbon adsorption;
- Those options which would result in a slightly higher VOC control efficiency will also consume more energy (in the form of natural gas consumption) than carbon adsorption;
- The RBLC does not have any entries for a process of this type with a control system with a greater efficiency. The only two entries in RBLC with control efficiencies greater than 95% are for processes that appear to have high concentration, low air flow rate exhaust streams.

The OAM has determined that carbon adsorption at a VOC removal efficiency of 95% or 10 ppm (when low VOC inlet concentration) outlet VOC concentration represents BACT for both the Monensin and Narasin finishing processes. Based upon this control system and potential emission estimates, potential emissions after control are estimated to be 23.7 tons per year for the Monensin finishing process and 23.0 tons per year for the Narasin finishing process.

Monensin Expansion Particulate Matter Emissions

Several equipment changes are proposed for the Monensin finishing process, including a new pellet mill, roller mill and associated equipment.

Following the installation of the proposed equipment, the Monensin process will be capable of operating at a higher production rate than in the past. Consequently, Lilly has also considered the impact of debottlenecked emission increases in PM-10 from the Monensin process in both building C47 and building C45.

As a result of the installation of VOC control equipment for this process, a new dust collector will also be installed to further filter particulates in the exhaust stream prior to their entry into the VOC control unit. Since all building C47 PM-10 emission units (with the exception of small vacuum units) will vent through this system, this will result in additional control of PM-10 beyond existing control levels. The estimated PM and PM-10 emissions from the Monensin process following the change will be below significant levels, as defined under PSD regulations.

Potential To Emit from Building C47 after the BACT implementation

Process	PM/PM10* (tpy)	VOC (tpy)
C47 Narasin	10.1	23.0
C47 Monensin	4.62	23.7
Total	14.72	46.7

* PM/PM10 emissions were previously permitted under operation permit 83-09-91-0082, registration issued on June 5, 1984, and construction permit CP 165-2436.

C-45 Building Product Recovery VOC Emissions Increases

Although no changes are proposed for equipment within the C-45 building process area, the potential increase in process rate for the Monensin finishing operations will debottleneck production in building C45, thereby potentially increasing emissions in building C45.

Narasin Process Description in Building C45

The production of Narasin occurs in the same manner as described for Monensin. Since this process is not being modified, a detailed description is not given here.

Methodology for C45 VOC Calculations

Lilly used a mass balance equation to determine the VOC emissions increase from Building C45. Amyl alcohol is introduced into the Monensin product just before entering Building C45. Past actual purchases of amyl alcohol was used to determine the amount entering the building. There are four known points at which amyl alcohol can exit the building: C47 product transfer, COL201/219 effluent stream, EV108 effluent stream and HE002H drain line. Lilly used historical data for percent amyl alcohol in the product transfer, effluent streams and drain line and the actual product transfer rates to estimate the amount of amyl alcohol exiting the building at these known points. Any amyl alcohol not accounted for when balancing the amount entering and exiting the building at known points was assumed to be emissions to the atmosphere.

To estimate the future potential amount of amyl alcohol purchased, Lilly used historical data for usage of amyl alcohol per BKg of Monensin produced and then assumed a linear correlation to obtain future usage. Lilly then used historical data and potential transfer rates to estimate the amount that would exit the building from known, leaving any remaining amyl alcohol as VOC emissions from the building. Finally, Lilly compared the potential and past actual VOC emissions from Building C45 to estimate the net emissions increase.

Emission estimates for Monensin product recovery were performed comparing historic actual emissions (average of 1997 and 1998 emission rates) to future potential emission rates. Based upon this computation, the potential increase in VOC emissions from Monensin product recovery is determined to be 134 tons per year (744 tons per year future potential versus 610 tons per year average for 1997/1998).

Building C45	Process	Actual Emissions (t/yr)	Potential Emission Rate (t/yr)	Net emissions increase
	Monensin	610	744	134
	Total			417

* Future VOC emissions were calculated assuming BACT was not there. Because this VOC increase actually existed before the expansion in building C47, potential to emit is calculated before the control. Therefore, this is subject to PSD review.

Summary of Emissions

The first table summarizes the increase in emissions as a result of the Monensin capacity expansion. The second table provides a summary of PM and VOC emissions from these processes after installing the best available control technology.

Net Emissions Increase due to modification

Process	PM/PM10	VOC
Building C45 Increase	Negligible	134
Building C47 Increase*	-18.3	417
Net Emissions Increase	-18.3	551
PSD Significance Threshold	25/15	40

Potential To Emit from Building C47 after the BACT implementation

Process	PM/PM10* (tpy)	VOC (tpy)
C47 Narasin	10.1	23.0
C47 Monensin	4.62	23.7

* PM/PM10 emissions were previously permitted under operation permit 83-09-91-0082, registration issued on June 5, 1984, and construction permit CP 165-2436.

Emission Controls/Best Available Control Technology (BACT)

Pursuant to 326 IAC 2-2, and 40 CFR 52.21, a BACT must be applied for any modification that results in net emissions above the significant values for a major source in an attainment area. As described above, a BACT must be determined for:

- VOC emissions from the Monensin finishing process in C47, and
- VOC emissions from the Narasin finishing process in C47.

Under EPA guidance, no BACT analysis is required for the C-45 process area (even though net VOC emissions are above significant emission increase thresholds), since there is no modification to the C-45 process.

Lilly has performed a detailed analysis of potential control measures for the Monensin and Narasin finishing processes, and has evaluated control measures and emission limitations required for similar operations through the RACT/BACT/LAER Clearinghouse (RBLC). Based upon this analysis, the OAM concludes that carbon adsorption units at control efficiencies of 95% or 10 ppm outlet concentrations represents BACT for the Monensin and Narasin finishing processes. This conclusion is based upon the following factors in regards to these operations:

- Carbon adsorption results in the lowest control costs of the options considered to be feasible for these operations;
- Lilly operates carbon adsorption units for other processes that are able to achieve similar levels of VOC control;

- The incremental cost of recovering additional control of VOC emissions through the use of the lowest cost combustion control technology (regenerative thermal incineration) is $47,354 per ton of VOC for the Monensin Finishing process and $49,303 per ton of VOC for the Narasin Finishing process;
- Carbon adsorption allows Lilly to reuse recovered amyl alcohol, resulting in the recycling of over 235,000 gallons (784 tons) per year at maximum capacity for the Monensin and Narasin Finishing processes combined;
- Those options which would result in a slightly higher VOC control efficiency will, as a byproduct of combustion, produce emissions of NOx and other air pollutants that would not occur through the use of carbon adsorption;
- Those options which would result in a slightly higher VOC control efficiency will also consume more energy (in the form of natural gas consumption) than carbon adsorption;
- The RBLC does not have any entries for a process of this type with a control system with a greater efficiency. The only two entries in RBLC with control efficiencies greater than 95% are for processes that appear to have high concentration, low air flow rate exhaust streams.

In addition to the above analysis, Lilly has concluded that controlling fugitive VOC emissions from various components of the carbon adsorption piping system is not necessary. The amount of emissions (0.46 tpy) associated with a 5% amyl alcohol stream in the condensate piping does not justify controlling these with any type of leakless technology or performing any leak detection and repair program.

As provided in the detailed BACT Analysis, Lilly has concluded that BACT for the Narasin and Monensin finishing processes is carbon adsorption for each process, meeting a 95% control efficiency or 10 ppm amyl alcohol outlet concentration.

1.6 Rules Compliance Summary

326 IAC 1-7: Stack Height Requirements
The provisions of 326 IAC 1-7 apply to stacks which actually emit PM or SO2 in quantities greater than 25 tons per year. The stacks associated with these processes do not emit PM or SO2 in quantities greater than 25 tons per year. Therefore, this rule does not apply.

326 IAC 2-1.1, 326 IAC 2-2, and 40 CFR 52.21: Permit Review/PSD Review
As described above, potential VOC emissions associated with this application are above 25 tons per year, resulting in the applicability of the Indiana permit rule, 326 IAC 2-1.1. Since the Lilly Clinton facility is a major source under Title V regulations and the proposed modification will trigger the PSD Rule (326 IAC 2-2), modifications to the plant are implemented through the Title V permit modification procedures of 326 IAC 2-7.10.5(g). Application forms are attached that fulfill the requirements of this Rule.

Because potential VOC emissions will exceed 40 tons per year and the Lilly Clinton facility is an existing major source as defined under PSD regulations, the proposed modification will trigger PSD requirements under 326 IAC 2-2 and 40 CFR 52.21. No other pollutant regulated under PSD will have an increase in emissions above significant net emission increase levels as defined under the rule. PSD regulations trigger the following requirements:

BACT Requirement for Monensin and Narasin Finishing Processes
Lilly must provide a demonstration that VOC emissions from the Monensin and Narasin finishing processes will be controlled using the Best Available Control Technology (BACT). This demonstration is provided in a separate attachment to this summary (Attachment 2).

Air Quality Analysis
Any source subject to PSD regulations that has an increase in actual VOC emissions above 100 tons per year is required to perform an ambient impact analysis, including the gathering of ambient ozone air quality data where appropriate. Although there is not an air quality monitoring site located at the Lilly Clinton site, IDEM currently does operate an ozone monitoring station in Vigo County, which is approximately fifteen miles south of the Lilly Clinton plant site. Due to the regional nature of ambient ozone concentrations, Lilly believes that the Vigo County ozone monitoring station is sufficient to provide data on baseline ozone concentrations at the Lilly Clinton site. Accordingly, Lilly requests that IDEM accept the Vigo County ozone monitoring data as representative of the Clinton plant site.

Air Quality Impact
On 13 March 2000, Lilly staff met with Mark Derf of the Office of Air Management (OAM) to discuss requirements for air quality impact modeling for VOC sources under PSD regulations. Although 326 IAC 2-2 and 40 CFR 52.21 appear to require an ambient air quality impact analysis for a project with significant net emission increases of more than 100 tons per year of VOCs, EPA has historically not required a rigid assessment of impact upon ozone concentrations from VOC sources due to the nature of ozone formation, which is more difficult to predict than pollutants that can be modeled with Gaussian dispersion models. Mr. Derf indicated that OAM is currently conducting ozone modeling analyses in-house for sources subject to PSD ozone air quality analysis requirements. Lilly has compiled information of the nature and format that Mr. Derf indicated would be necessary to perform this analysis (Attachment 3). Lilly requests that the data in Attachment 3 be forwarded to Mr. Derf to allow this analysis to proceed.

Other Impacts Assessment
Lilly is also required to identify any other environmental impacts that might occur as the result of its proposed plant modification. At the time all plant modifications have been completed, Lilly estimates that no additional persons will be employed at Clinton Labs due to the proposed modifications. Environmental impacts from vehicular traffic associated with employees or additional truck traffic are expected to be minimal.

Lilly is located at a rural site along State Road 63. The western half of the property is underlain by glacial outwash consisting of sand and gravel with minor silt. The eastern half of the property is underlain by alluvial sand and gravel similar to the outwash. However, in this area, the sand and gravel is capped by up to 33 feet of fine grained soils (silt). Other soils in the vicinity of the property include, but are not limited to, sandy loam, silty clay loam and muck. Amyl alcohol would not be expected to impact soils in the vicinity of the plant.

Vegetation in the area is predominantly agricultural. Amyl alcohol would not be expected to adversely impact vegetation in the area. No impact upon visibility would be anticipated based upon projected emissions.

This site is greater than 100 miles from the nearest Class I area, which is Mammoth Cave National Park in Kentucky and thus will not impact any Class I areas.

326 IAC 5-2: Opacity Limitations
Pursuant to 326 IAC 5-2, Lilly must meet an opacity limit of 40% from its operations. As discussed above, all particulate sources (with the exception of small vacuum units) will exhaust to a common duct system with an additional dust collector prior to the carbon adsorption unit. Due to the need to protect the carbon adsorption units from clogging as the result of high particulate matter inlet concentrations, Lilly will maintain and operate these collectors at all times that the Monensin and Narasin finishing processes are in operation. The use of these collectors will assure that Lilly will be in compliance with applicable opacity limits.

326 IAC 6-3: Particulate Matter Limitations from Process Operations

Indiana Rule 326 IAC 6-3 provides that particulate matter emissions from process operations are limited on the basis of the process weight rate for the process. It is not clear from the rule how allowable emission rates are to be computed from processes with multiple emission units and multiple exhaust points. Lilly believes that there are distinct and separate processes within Building C47 which should each have its own calculated limit based on the equation in 326 IAC 6-3-2(c). However, for administrative purposes and ease of compliance monitoring, Lilly proposes that the limitation be applied to all emission units exhausting through the carbon adsorbers. For example, all emission units exhausting to CA190 (Narasin carbon adsorber) will have a single allowable emission rate based upon the finished product process weight rate. Finally, Lilly does not believe this rule is applicable to the vacuum systems utilized for facility sanitation, as these are not "process" operations.

326 IAC 8-1-6: VOC Control

Indiana Rule 326 IAC 8-1-6 requires that any new source with potential VOC emissions above 25 tons per year demonstrate that VOC emission limitations will be limited through the use of Best Available Control Technology. The BACT requirement under PSD regulations will fulfill the requirement of this rule.

326 IAC 8-5-3: Synthesized Pharmaceutical Operations

The operations described in this permit application do not perform chemical synthesis to derive any final or intermediate product. Therefore, the requirements of 326 IAC 8-5-3 do not apply.

326 IAC 2-4.1, 326 IAC 14, 40 CFR Part 61, and 40 CFR Part 63: Hazardous Air Pollutants

There are no National Emission Standards for Hazardous Air Pollutants which apply to these processes because they do not utilize or produce any hazardous air pollutants (HAP). Likewise, the case-by-case control technology determinations required by 326 IAC 2-4.1 are not applicable because no hazardous air pollutants are emitted.

326 IAC 2-12 and 40 CFR Part 60: New Source Performance Standards

None of the New Source Performance Standards (NSPS) promulgated in 40 CFR Part 60 or 326 IAC 12 apply because none of the facilities in this project are "affected facilities" as defined by the various NSPS rules.

ATTACHMENT 1
EMISSIONS ESTIMATES

The following attachment is a summary of detailed calculations performed by Lilly to determine after control VOC emissions from the Narasin and Monensin finishing processes, as well as VOC and PM net emissions increases due to the modification of the Monensin finishing process in C47. Detailed emissions calculations are considered confidential business information and have been submitted with a claim of confidentiality, pursuant to 326 IAC 17-1.

The emissions summaries are presented as follows:

ATTACHMENT 2
BACT ANALYSIS

ATTACHMENT 3
AIR QUALITY IMPACT ASSESSMENT

AIR QUALITY IMPACT ASSESSMENT

On 13 March 2000, Lilly staff met with Mark Derf of the Office of Air Management (OAM) to discuss requirements for air quality impact modeling for VOC sources under PSD regulations. Although 326 IAC 2-2 and 40 CFR 52.21 appear to require an ambient air quality impact analysis for a project with significant net emission increases of more than 100 tons per year of VOCs, EPA has historically not required a rigid assessment of impact upon ozone concentrations from VOC sources due to the nature of ozone formation, which is more difficult to predict than pollutants that can be modeled with Gaussian dispersion models. Mr. Derf indicated that OAM is currently conducting ozone impact modeling in-house for sources subject to PSD ozone air quality analysis requirements.

Lilly has compiled information of the nature and format that Mr. Derf indicated would be necessary to perform this analysis and has included the information in this attachment. Lilly believes that the information contained in this attachment and the subsequent modeling performed by the OAM shall satisfy the requirements of 326 IAC 2-2-5.

Lilly has included the following information necessary for point source modeling of VOC emissions from expansion to the Monensin granulation process:

- Plant Layout Diagram
- Building Dimensions
- Building Roof Stack Diagrams
- Stack Parameters
- Meteorological Wind Rose

As indicated in the application document, Lilly requests that IDEM accept the Vigo County ozone monitoring data as representative of the Clinton plant site.

ATTACHMENT 4
OFFICE OF AIR MANAGEMENT
APPLICATION FORMS