ADDITIONAL TECHNICAL INFORMATION FOR CHEMICAL/PHARMACEUTICAL PROCESSES

The following information will be used for the technical review of a permit to install application for a **chemical/pharmaceutical process.** This information is in addition to the general requirements outlined in the AQD document "Information for an Administratively Complete Permit to Install Application", Part 2 - Additional Supporting Information, Items A through F. All of the information may not be needed for each application. Also, this document may not be all inclusive. Additional information beyond that identified may be necessary to complete the technical review of any individual application. In the event a determination is made that new additional information is needed for a technical review, this document will be updated.

All referenced guidance documents are available at http://www.deq.state.mi.us/aps or you may contact the Permit Section at 517-373-7023.

A. Process Description

1. Provide a general process overview. A complete, process description should include a list of all chemical or registered trademark names of chemical products, intermediates, and/or raw materials to be produced or consumed, and the ultimate use(s) of the product(s).
2. Describe each process step. At a minimum include the process chemistry and stoichiometrically balanced reaction equation or material mass balance on all components.
3. Describe the methods and equipment used to receive, store, handle and charge raw materials.
4. Describe the methods and equipment used to handle, store or package final products and intermediates.
5. Provide process flow diagrams or equipment layout drawings which clearly show the process flow relationships among all pieces of process and control equipment. Identify all air emission discharge points. Discuss instrumentation and air pollution controls for the process.
6. Discuss the possibilities of process upsets or other events that could cause non-routine emissions. Include the duration and frequency of any upsets or other events, and consequences (including estimated amounts and identification of air emissions). Describe rupture discs, pressure relief valves and secondary containment systems.
7. Discuss any fugitive emissions and the methods used to minimize them.
8. Include the following plans for the process, if available:
   a) Preventative maintenance and malfunction abatement plan. (Recommended for all control equipment)
   b) Continuous emissions (in-stack) monitoring plan
   c) Ambient air monitoring plan
   d) Emergency response plan

B. Regulatory Discussion

The following state air pollution control regulations may be applicable. Please review these regulations carefully to determine if they apply to your process and summarize the results in the application. The Air Pollution Control Rules may be viewed and downloaded from the AQD website at: www.michigan.gov/deqair.

1. State of Michigan, Department of Environmental Quality, Act 451 of 1994, Natural Resources and Environmental Protection Act, Part 55 Air Pollution Control and the following promulgated rules:
   a) Rules 215 and 216 apply to an existing facility which has a current Renewable Operating Permit (ROP). A Permit to Install issued for the installation of new equipment or modifications to existing equipment is incorporated into an ROP pursuant to Rules 215 and 216.
   b) Rule 220 applies to a major source and/or a major modification at a source which is located in a non-attainment area. A non-attainment area is one where the National Ambient Air Quality Standards (NAAQS) are not being met. Rule 220 requires compliance with the lowest achievable emission rate (LAER) and an emission reduction (offset) for each non-attainment air contaminant emitted in significant

quantities as defined by Rule 119(e). However, a source may choose to "net out" of the requirements of Rule 220. Refer to "Guidelines for a Netting Demonstration" for additional detailed information.

c) If the process or equipment was installed or modified after April 17, 1992, Rules 224 – 230 apply. Rule 224 requires the application of Best Available Control Technology for toxics (T-BACT) for all non VOC toxic air contaminants (TACs). T-BACT does not apply to emissions of VOCs. Rule 225 limits the emission impacts of TACs and requires a demonstration that the proposed emission of each TAC complies with a health-based screening level. Compliance can be demonstrated using any of three methods described in Rule 227(1) including the use of computerized dispersion modeling. Refer to "Guidelines for Conducting a Rule 224 T-BACT Analysis," "TACs-Demonstrating Compliance with Rule 225," and "Dispersion Modeling Guidance" for additional detailed information.

d) If the process or equipment was installed or modified after August 1, 1979, Rule 702 applies. This rule requires Best Available Control Technology (BACT) for new sources of volatile organic compounds (VOCs). Refer to "Instructions for Conducting a BACT Analysis" for additional detailed information.

e) Rule 901 prohibits emissions of an air contaminant in quantities that cause either a) injurious effects to human health or safety, animal life, plant life of significant economic value, or property; or b) unreasonable interference with the comfortable enjoyment of life and property.

2. Federal Prevention of Significant Deterioration (PSD), 40 CFR Part 52.21. The federal PSD regulations apply to a major source and/or a major modification at a source which is located in an attainment area. An attainment area is one where all the NAAQS are being met. However, as with the non-attainment permitting, a source subject to the PSD regulations may choose to "net out" of the requirements. Refer to "Federal PSD Requirements," "Instructions for Conducting a BACT Analysis," and "Guidelines for a Netting Demonstration" for additional detailed information.

   - The Clean Unit test is an alternate method for determining PSD applicability. It encourages industries to invest in control equipment by providing greater operational flexibility after the control equipment is installed. Refer to "Federal PSD Requirements" and the "PSD Workbook" which is available on the Internet at http://www.deq.state.mi.us/aps/downloads/permits/PSD%20Workbook.pdf.

3. The PSD increments (40 CFR 52.21 (c)) and the NAAQS (40 CFR 52.21(d)) apply to all sources throughout the United States, regardless of size. Compliance with these air quality standards can be demonstrated using computerized dispersion modeling. An applicant for a PSD permit is required to submit PSD increment modeling for PM-10, SO_2 and NOx, and NAAQS modeling for PM-10, SO_2, NOx, CO, Ozone, and Lead as part of the application. Modeling for sources not subject to PSD may be done by the AQD. Refer to "Dispersion Modeling Guidance" for additional detailed information.

4. Federal Standards of Performance for New Stationary Sources (NSPS), 40 CFR Part 60, may contain requirements for various chemical and pharmaceutical processes. These federal regulations should be consulted carefully to determine applicability to your process.

5. National Emission Standards for Hazardous Air Pollutants (NESHAP), 40 CFR Parts 61 and 63 may contain requirements for chemical and pharmaceutical processes at affected facilities. See the list below for MACT standards that may be applicable.

6. If a specific MACT does not apply: Section 112(g) regulations of the federal Clean Air Act require any constructed or reconstructed major source of Hazardous Air Pollutants (HAPs) be equipped with Maximum Achievable Control Technology (MACT) for individual and total HAPs greater than 10 and 25 tons per year, respectively. Refer to "Guidelines for Conducting a 112(g) Analysis" for additional detailed information.

C. Control Technology Analysis

1. Rule 702 BACT applies to all sources of VOCs proposed to be installed within the State of Michigan. A Rule 702 BACT analysis is very similar to a PSD top-down BACT analysis. Michigan's air pollution control rules also define BACT as an emission limit. Rule 702 BACT should be applied on a flexible grouping of equipment – subdivisions of emission units and/or groupings of emission units – as long as it is logical to do so. Logical means that the principles on which the groupings (or subdivisions) are made are consistent with federal guidance and sound engineering practices. Refer to "Instructions for Conducting a BACT Analysis" for additional detailed information.

2. Best Available Control Technology for Toxics (T-BACT) means the maximum degree of emission reduction which the Department determines is reasonably achievable for each process that emits toxic air

contaminants (TACs) taking into account energy, environmental and economic impacts, and other costs. T-BACT does not apply to VOCs. The analysis must be specific to the process and the TACs subject to a T-BACT review. T-BACT limits can be expressed as an emission limit, control equipment requirements, and/or work practice standards. Refer to "Guidelines for Conducting a Rule 224 T-BACT Analysis" for additional detailed information.

3. Lowest achievable emission rate (LAER) applies to a major source and/or a major modification at a source located in a non-attainment area. Currently the only two pollutants which may be subject to LAER in Michigan are VOCs and NOx. LAER is defined as the lowest emission limitation contained in any State Implementation Plan (SIP) or the lowest emission limitation achieved in practice. Such an emission limit is presumed to be LAER for that source class and category. If an applicant proposes to meet this presumptive LAER, no site-specific control technology determination will be necessary. When an applicant believes the presumptive LAER limit is not achievable, a site-specific determination is required. This determination should include consideration of raw material changes, process changes, and add-on control equipment. The cost of these changes is not considered. Raw material and process changes should be evaluated through technology transfer (i.e., the likelihood that such a change will transfer from one industry to another), based on the manufacture of similar products or use of similar raw materials or fuels. Add-on controls should be evaluated based on the physical and chemical characteristics of the pollutant-bearing exhaust stream.

D. Emissions Summary and Calculations

1. For each pollutant, provide the basis for the emission reduction(s) or control efficiencies claimed.
2. Calculate estimated emissions due to receiving, storing, handling, charging, or packaging raw materials, intermediates or final products.
3. For all <u>batch</u> processes provide the following:
   a) Total batch time
   b) Emissions of each pollutant from each process step, in pounds per batch or pounds per day
   c) Annual emissions in tons, based on number of batches requested per year
   d) The total time for each process step and the duration of the emissions during the process step

MACT Standards

Source Category	MACT Subpart	Process Description
Cellulose Product Manufacturing	UUUU	Production of various cellulose products
Hazardous Waste Incineration	EEE	Hazardous waste burning incinerators, cement kilns and lightweight aggregate kilns
Hydrochloric Acid (HCl) Production	NNNNN	Hydrochloric acid and fumed silica production
Hazardous Organic NESHAP (HON)	F, G, H, I	Organic HAPs from SOCMI and other processes subject to the regulations for equipment leaks
Miscellaneous Organic NESHAP (MON)	FFFF HHHHH	Production of various organic chemicals including paints, coatings and adhesives
Off-Site Waste Recovery Operations	DD	Treatment, recovery, disposal of wastes from off-site locations
Organic Liquid Distribution	EEEE	Distribution operations of non-gasoline organic liquids
Pesticide Active Ingredient Production	MMM	Production of various pesticide active ingredients
Pharmaceutical Production	GGG	Production of various pharmaceutical products
Polymer and Resin (6 parts)	U, W, J, JJJ, OOO	Production of various polymers and resins
Polyurethane Foam (2 parts)	MMMMM, III	Flexible polyurethane foam fabrication operations and production
Portland Cement Manufacturing	LLL	Portland cement production
Publicly Owned Treatments Works	V V V	Waste treatment disposal
Refinery (2 parts)	CC, UUU	Petroleum refineries, catalytic cracking and reforming units
Reinforced Plastic Composites	WWWW	Reinforced plastic composites production
Semiconductor Manufacturing	BBBBB	Semiconductor manufacturing
Vegetable Oil – Solvent Extraction	GGGG	Solvent extraction for vegetable oil production