



DANIEL S. GREENBAUM
Commissioner
JOHN J. HIGGINS
Regional Director

The Commonwealth of Massachusetts

Executive Office of Environmental Affairs

Department of Environmental Protection

Western Region

436 Dwight Street, Springfield, Mass. 01103

(413) 784-1100

December 18, 1992

Mr. Edward Jamro, Environmental Superintendent
Monsanto Company - Chemical Group
730 Worcester Street
Springfield, MA 01151

Re: PVAPCD - Springfield
Regulation 310 CMR 7.02(2)(b)
Transmittal # 46119
Biofilter Modification

CONDITIONAL APPROVAL

Dear Mr. Jamro:

The Department of Environmental Protection, Division of Air Quality Control, Western Regional Office ("Department") received an application on September 17, 1992 for the installation of the necessary piping, eductor, and controls to connect five existing emission sources to the biofilter which currently controls emissions from the polyvinyl butyral resin drier at the South Butvar Department located at Monsanto Company's Indian Orchard Plant, 730 Worcester Street in Springfield, Massachusetts. The proposed modification of the new biofilter and emission reductions that will be achieved are part of Monsanto's effort to meet a voluntary commitment to reduce Superfund Amendments and Reauthorization Act (SARA) air emissions by 90 percent from 1987 to 1993.

The submittal documents bear the authorization signature of Michael Kulig, Plant Manager. Stamped, approved copies of the submittal items are included with this Conditional Approval.

Review of the application by Department engineers reveals the following:

The five new vessels to be controlled are as follows:

PK-1 Exhaust from Chilled Condenser
PK-2 Exhaust from Chilled Condenser
Wash Tank #1
Wash Tank #2
D-Column Condenser

The five sources will utilize the recently approved Biofilter (Conditional Approval #1-P-92-006) for control of volatile organic compound (VOC) emissions. The five exhaust streams will

be manifolded and directed to the existing South Butvar dryer scrubber (Conditional Approval #PV-85-IF-012) which is upstream to the biofilter. The scrubber provides cooling and humidification of exhaust gases before entering the Biofilter.

An eductor is proposed to convey the manifolded exhaust into the biofilter. It will operate to maintain atmospheric pressure at the point where the polykettle exhausts connect to the manifold duct. The additional flow to the scrubber (approximately 200 cfm) will be negligible compared to the present flow (approximately 18,000 cfm) from the South Butvar drier exhaust.

The Biofilter is expected to be 95% efficient in removal of emissions from the five sources listed above. Therefore, emissions are expected to be reduced from 45.0 tons per year to 2.2 tons per year. Emissions estimates were based on either 1991 Source Registration information (Wash Tank #1 & #2) or stack test data (PK-1, PK-2, and D-Column). Potential emissions from the five newly controlled vessels of the polyvinyl butyral resin manufacturing process are based on an operating schedule of 24 hrs/day, 7 days/week, 52 weeks/yr.

As a result of the review of the plans and specifications, the Department is of the opinion that the use of the Biofilter for these five additional sources, is in conformance with modern air pollution control engineering practice and Best Available Control Technology. The Department hereby grants conditional approval for these plans and specifications as submitted pursuant to Regulation 310 CMR 7.02(2)(b) of the "Regulations for the Control of Air Pollution in the Pioneer Valley Air Pollution Control District", with the following provisions:

1. Monsanto shall notify the Department in writing when these modifications are complete and ready for inspection by Department personnel.
2. Monsanto shall operate all of the new equipment and newly controlled sources in compliance with all other applicable "Regulations."

Please be advised that all the provisions of the Department's May 26, 1992 Conditional Approval for the installation and operation of the Biofilter remain in force.

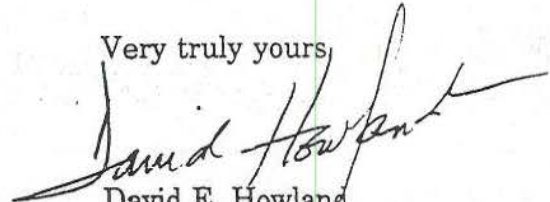
This approval pertains only to the air quality control aspect of the proposal and does not negate the responsibility of the owners or operators to comply with other applicable State, Local, or Federal laws and regulations.

The Department has determined that the filing of an Environmental Notification Form ("ENF") with the Secretary of Environmental Affairs, for air quality control purposes, was not required prior to this action by the Department. Notwithstanding this determination, the Massachusetts Environmental Policy Act and Regulation 301 CMR 11.00, section 11.03, provide certain "Fail-Safe Provisions" which allow the Secretary to require the filing of an ENF and/or an Environmental Impact Report at a later time.

This Conditional Approval is an action of the Department. There are limited rights of appeal. For a description of these rights, read the enclosure "APPEAL RIGHTS" carefully.

For future correspondence regarding your application, please include the transmittal number listed above. If you have any questions, please contact Catherine Chamberlain or John Kirzec of the Western Regional Office at 1-413-784-1100.

Very truly yours,



David E. Howland
Regional Engineer
Bureau of Waste Prevention
Western Region

CC/cc /mr
w:biomodif.apr
Enc.

cc: Walter Sullivan, DEP/DAQC, 1 Winter Street, Boston, MA 02108
Norman Phillibert, Sr. Environmental Engineer

APPEAL RIGHTS

This Conditional Approval is an action of the Department. If you are aggrieved by this action, you may request an adjudicatory hearing. A request for a hearing must be made in writing and postmarked within twenty-one (21) days of the date you received this Conditional Approval.

Under 310 CMR 1.01(6)(b), the request must state clearly and concisely the facts which are the grounds for the request, and the relief sought. Additionally, the request must state why the Conditional Approval is not consistent with applicable laws and regulations.

The hearing request along with a valid check payable to Commonwealth of Massachusetts in the amount of one hundred dollars (\$100.00) must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
P.O. Box 4062
Boston, MA. 02211

The request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below.

The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority.

The Department may waive the adjudicatory hearing filing fee for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file, together with the hearing request as provided above, an affidavit setting forth the facts believed to support the claim of undue financial hardship.



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436 Dwight Street, Springfield, Mass. 01103
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May 26, 1992

Mr. Edward Jamro, Environmental Superintendent
Monsanto Company - Chemical Group
Indian Orchard Plant
730 Worcester Street
Springfield, MA 01151

Re: PVAPCD - Springfield
Regulation 310 CMR 7.02(2)(b)
Transmittal # 8294
Application # 1-P-92-006
Biofilter/Water Scrubber

CONDITIONAL APPROVAL

Dear Mr. Jamro:

The Department of Environmental Protection, Division of Air Quality Control, Western Regional Office ("Department") received an application on February 27, 1992 for the modification of the air pollution control system on the resin dryer exhaust at the South Butvar resin manufacturing facility located at Monsanto Company's Indian Orchard Plant, 730 Worcester Street in Springfield, Massachusetts. The existing wet scrubber, used to reduce volatile organic compounds ("VOC") in the resin dryer air stream, will be modified to operate in series with the biofilter proposed in your submittal. Included in the submittal are results of a pilot test program used to investigate the feasibility of using a biofilter to treat this exhaust stream. The submittal documents bear the seal and signature of John R. Martin, Massachusetts Registered Professional Engineer No. 29533. Stamped, approved copies of the submittal items are included with this Conditional Approval.

Review of the application by the Department engineers reveals the following:

The South Butvar facility produces a polyvinyl butyral resin used in the manufacture of automobile safety glass. The resin is dewatered in a centrifuge and dried in a rotary dryer prior to collection in a cyclone and baghouse. The baghouse will be equipped with a bag break detector. The collected resin is then conveyed to bulk storage silos. Liquid from the dewatering process is directed to a distillation operation for recycling.

The flow through the cyclone and baghouse will be approximately 22,290 ACFM at 149°F. Following the baghouse, the dryer exhaust stream will be directed to a wet scrubber for reduction of VOC and for cooling.

The water scrubber has a rated air handling capacity of 25,750 SCFM. When operated in conjunction with the biofilter, the wet scrubber water flow will be approximately 350 gallons per minute ("gpm"), 200 gpm of which will be recycled water and the remainder city water. Water flow ratios will be adjusted for seasonal temperature changes in order to maintain proper biofilter operating temperatures. In the event one or more of the three cells of the biofilter is off-line, the scrubber shall revert to operation in accordance with previously issued Department Conditional Approvals.

The exhaust stream will leave the wet scrubber at a flow rate of approximately 18,360 ACFM at 100°F and enter a humidification chamber where the air stream humidity will be brought to 95%. The humidification chamber will utilize city water, biofilter sump recycle, filtered recycle from the humidification surge tank, and process steam as needed.

An air supply fan, rated at 21,000 SCFM, will be located prior to the humidification chamber. Humidified air will then enter the biofilter at a flow rate of approximately 18,420 ACFM at 95°F. The air will be evenly distributed into the three cells of the biofilter via the BIKOVENT, acid resistant, interlocking cement block system. The interlocked blocks or "stones" support the filter biomass, evenly distribute air into the biomass, and provide for drainage of leachate. Flow rates will be monitored at the entrance to each biofilter cell. Humidity and temperature of the exhaust from the humidification chamber will be monitored and signaled to the control room. Leak detection will be conducted on any leachate collected from the second of two HDPE 60 mil thick liners which lie under the BIKOVENT system.

The biofilter structure will measure 60 feet wide by 120 feet long and will be divided into three equally sized cells. The area available for biofiltration (i.e. active area) for each cell, measures approximately 36.7 feet by 49.2 feet (1807 ft²), or a total active area of 5422 ft². Based on a nominal biomass depth of 1 meter (3.28 feet), the total active volume of the three biofilter cells is 17,781 ft³. The linear velocity through the active area is nominally 3.79 feet/minute, based on a maximum design air flow of 20,580 acfm. Residence time of the air stream in the biofilter under these conditions is 52 seconds.

On May 7, 1992, the Department received a letter detailing the specifications of the biomedial compost material from the vendor, Biofiltration, Inc. The VOC removal performance of the biomedial in this proposed biofilter is expected to equal or exceed that of the biomedial used in the pilot biofilter.

The effectiveness of the biofilter to remove contaminants from the exhaust is dependent upon many operating parameters such as moisture, pH, porosity of the biomass, air flow rate, uniformity of aeration, concentrations of contaminants, and ability of the microbes to degrade the given contaminants. The biofilter pilot study has indicated that high removal rates are

achievable for the compounds to be controlled. Removal efficiency of the scrubber and biofilter in series is expected to be greater than 95%.

The maximum potential emissions (based on 8760 hours of operation) from the operation of the scrubber/Biofilter are indicated in Table 1 below:

TABLE 1
Maximum Potential Emissions
for the scrubber/Biofilter

Chemical	Before Control lbs/hr	After Control lbs/hr
Ethyl Alcohol	24.4	1.22
Ethyl Acetate	25.7	1.29
N-butyraldehyde	12.8	0.64
=====		3.15 lb/hr
		13.8 tons per year

As a result of the review of the plans and specifications, including the results of the pilot study, the Department is of the opinion that the proposed modification of the existing water scrubber and installation of the biofilter is in conformance with modern air pollution control engineering practice and Best Available Control Technology.

The Department hereby grants conditional approval for these plans and specifications as submitted pursuant to Regulation 310 CMR 7.02(2)(a) of the "Regulations for the Control of Air Pollution in the Pioneer Valley Air Pollution Control District", with the following provisions:

1. Monsanto Company shall conduct a smoke test of BIKOVENT distribution system prior to placement of Biofilter compost material, and shall provide the Department with advance notice of this test.
2. Monsanto Company shall install and operate flow indicators, calibrated in acfm, at the inlet of each cell of the Biofilter.
3. Monsanto Company shall not allow the flow to any cell of the Biofilter to exceed 7320 acfm (which is based on the minimum residence time of 44 seconds encountered during the pilot study, and the bed depth specified in provision 4 following).
4. Monsanto Company shall not allow the active depth of compost in any cell of the Biofilter to decrease to less than 2 feet 11 inches (which is 4 inches less than the design depth of 3.28 feet or 3 feet 3 inches).

10. Monsanto Company shall submit the original field data sheets from the tests in provision 9 (faxing of the data to the Department is preferred), no later than one business day following data generation, and shall submit summarized results to the Department for review no later than 21 days thereafter.
11. Monsanto Company shall conduct performance tests as detailed in provisions 1, 9, and 10 of this Conditional Approval whenever the biomedium in any cell is completely replaced.
12. Monsanto Company shall operate the scrubber/Biofilter at an efficiency greater than required for the scrubber alone under existing permits at all times after the Biofilter debugging/acclimation period.
13. Monsanto Company shall, at a minimum, conduct the following monitoring *on each of the three cells* of the Biofilter during the 12 month period following startup:
 - a) Monitoring, no less frequently than weekly for two months, and monthly thereafter, of bed moisture content.
 - b) Monitoring, no less frequently than monthly, of the following:
 - i) bed pH.
 - ii) bed mineral and organic content.
 - c) Monitoring, no less frequently than quarterly, of flow distribution and of VOC destruction efficiency (of the biofilter and the scrubber/biofilter combination). This monitoring shall occur in addition to the testing specified in provision 9, and shall entail sampling more points, to obtain more accurate data, than required by provision 9.

The specific details of the monitoring are left for Monsanto Company to determine. This 12 month period will serve to establish an initial Standard Operating and Maintenance Procedure ("SOP/SMP") for the scrubber/Biofilter combination.

SOP/SMP MANUAL AND FINAL COMPLIANCE TESTING:

14. Monsanto Company will submit a DRAFT of the SOP/SMP manual developed during the 12 month period after startup to the Department for review. The submittal shall be made within 60 days after the end of the 12 month period after startup.

The SOP/SMP manual will minimally include schedules, determined by the experience gained over this 12 month's operation, for the monitoring of the operating parameters specified in provision 13 of this Conditional Approval. Included in the submittal will be supporting operational data and justifications for the proposed schedules.

15. Monsanto Company shall submit a Compliance Test Protocol to the Department for review and approval for the scrubber/Biofilter Compliance Test. The Test

Protocol submittal shall be made within 60 days after the end of the 12 month period after startup.

16. Monsanto Company will conduct a Compliance Test of the scrubber/Biofilter no later than 30 days after the Department's approval of the Compliance Test Protocol.
17. Monsanto Company will submit a FINAL COMPLIANCE TEST REPORT and a FINAL SOP/SMP MANUAL to the Department for review and approval, in accordance with the Department's plan review regulations, within 60 days after completion of the Compliance Tests.
18. Monsanto Company will take appropriate steps to abate any nuisance condition(s) should such conditions be generated by the operation of this facility.

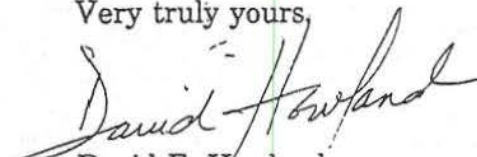
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Very truly yours,



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Bureau of Waste Prevention
Western Region

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Enc.

cc: Walter Sullivan, DEP/DAQC, 1 Winter Street, Boston, MA-02108
Norman Phillibert, Sr. Environmental Engineer