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BUREAU OF AIR REGULATION

THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

In the Matter of an
Application for Permit by:

Sea Ray Boats, Inc.
100 Sea Ray Drive
Merritt Island, FL 32953

OGC No. 99-1794
Permit No.: 0090093-003-AC; PSD-FL-274
Cape Canaveral Plant
Brevard County, Florida

/

NOTICE OF WITHDRAWAL
OF REQUEST FOR EXTENSION OF TIME

Sea Ray Boats, Inc. (Sea Ray), by and through undersigned counsel, hereby withdraws its Request for Extension of Time to file a petition for formal administrative proceedings in accordance with Chapter 120, Florida Statutes, with regard to the above-styled and numbered matter. Sea Ray has previously requested extensions of time from the Department of Environmental Protection (Department) through and including February 18, 2000, in response to the "Intent to Issue Air Construction Permit" and Proposed Permit (Permit No. 0090093-003-AC, PSD-FL-274) (Permit) for the proposed Cape Canaveral Plant to be located in Brevard County, Florida. The request was filed in order to negotiate certain changes to the Proposed Permit with the Department. Based on discussions among representatives from Sea Ray and the Department, agreement has been reached on the issues involved in the above-referenced Permit. The agreement between Sea Ray and the Department is reflected in the attached documents, which include a Revised Proposed Air Construction Permit, Final Determination, and Revised Best Available Control Technology (BACT) Determination (Exhibits A, B, & C, respectively).

Accordingly, Sea Ray hereby withdraws its Request for Extension of Time, conditioned upon the Department's issuance of the Proposed Permit, Final Determination and BACT Determination in accordance with the Department's agreement with Sea Ray.

Respectfully submitted this 18th day of February, 2000.

HOPPING GREEN SAMS & SMITH, P.A.

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Attorney for SEA RAY BOATS, INC.

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a copy of the foregoing has been furnished to the following by U.S. Mail on this 18th day of February, 2000:

Clair H. Fancy, P.E., Chief
Bureau of Air Regulation
Department of Environmental Protection
2600 Blair Stone Road
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PERMITTEE

Sea Ray Boats, Inc.
Cape Canaveral Plant
350 Sea Ray Drive
Merritt Island, Florida 32953

Permit No.	0090093-003-AC
	PSD-FL-274
Project	Fiberglass Boat Mfg. Plant
Expires:	January 31, 2003

AUTHORIZED REPRESENTATIVE:

Mr. Dennis Wilson, General Manager/Vice President

PROJECT AND LOCATION

This permit authorizes the applicant to construct a fiberglass boat manufacturing plant (Cape Canaveral Plant) initially consisting of a single lamination/assembly building, a single warehouse building, and associated facilities for employee offices and testing of finished boats. Any phased expansion of this facility that may involve segregation or separation of lamination processing into additional buildings will require a modification of this permit per Rule 62-4.080 and Chapters 62-210 and 62-212 of the Florida Administrative Code. The SIC code for this project is 3732.

The project is to be located at 1200 Sea Ray Drive, Merritt Island, Brevard County. The UTM coordinates are Zone 17; 531.85 km E; 3142.15 km N. This site is not located within 100 km of any Class I PSD Area. The Chassahowitzka National Wildlife Refuge is approximately 191 km west-northwest of the site.

STATEMENT OF BASIS

This construction/PSD permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and the Florida Administrative Code (F.A.C.) Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297. The above named permittee is authorized to construct the emissions units in accordance with the conditions of this permit and as described in the application, approved drawings, plans, and other documents on file with the Department of Environmental Protection (Department).

APPENDICES

The attached appendices are a part of this permit:

Appendix A	BACT/MACT Determination
Appendix B	NESHAP General Provisions
Appendix C	Applicant's Table 3 – Proposed Emissions Calculations
Appendix GC	General Permit Conditions

Howard L. Rhodes, Director
Division of Air Resources
Management

SECTION I. FACILITY INFORMATION

FACILITY DESCRIPTION

Sea Ray Boats operates three existing plants; the Merritt Island Plant, the Product Development and Engineering Plant, and the Sykes Creek Plant, located on Sea Ray Drive in Merritt Island approximately one mile west of the proposed plant. These plants are used to design and manufacture fiberglass boats. These plants and the proposed Cape Canaveral Plant are considered by the Department to comprise one facility.

PROJECT DETAILS

The proposed Cape Canaveral Plant will manufacture fiberglass boats of varying sizes up to about 75 feet in length. The plant's two production buildings will house facilities for the gel coat and lamination processes as well as parts and fabrication activities such as woodshop operations and warehousing. A separate building will be erected for offices and administration. The new plant will be located on Sea Ray Drive approximately one mile east of the existing plants between Sea Ray Drive to the south and the barge canal to the north. The first phase of the proposed plant will consist of the following emissions units.

EMISSIONS UNIT NO.	EMISSIONS UNIT DESCRIPTION
001	Building 101, Lamination & Assembly
002	Building 102, Fabrication
003	Accessory Structures

REGULATORY CLASSIFICATION

The facility, consisting of the three existing plants and the proposed plant, is classified as a Major or Title V Source of air pollution because emissions of volatile organic compounds (VOC) exceed 100 tons per year (TPY), and because emissions of one hazardous air pollutant (HAP) (styrene) exceed 10 tons per year and emissions of total HAP exceed 25 tons per year. This facility is not within an industry included in the list of the 28 Major Facility Categories per Table 62-212.400-1, F.A.C. Since emissions are greater than 250 TPY for VOC, the facility is also a Major Facility with respect to Rule 62-212.400, Prevention of Significant Deterioration (PSD). The emissions units are subject to limits determined as BACT for VOC and are subject to limits determined to be MACT for HAP.

REVIEWING AND PROCESS SCHEDULE

05-05-99	Date of Receipt of Application by Central District
07-19-99	Received Revised Volume II and MACT Proposal
08-11-99	Received EPA PSD Applicability Determination
09-03-99	Received PSD Analysis and Control Technology Review
09-30-99	Received Supplemental PSD Application Fee
10-06-99	Distributed Notice of Intent and Supporting Documents
10-31-99	Notice of Intent Published in Florida Today Newspaper

RELEVANT DOCUMENTS

The documents listed below constitute the basis for the permit and are on file with the Department.

- Permit application
- Applicant's additional information noted above
- Department's Technical Evaluation and Preliminary Determination and Intent to Issue

The following specific conditions apply to all emissions units at this facility addressed by this permit.

ADMINISTRATIVE

1. Regulating Agencies: All documents related to applications for permits to construct, operate or modify an emissions unit should be submitted to the Bureau of Air Regulation (BAR), Florida Department of Environmental Protection at Mail Station #5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, phone number 850/488-0114. All documents related to reports, tests, minor modifications and notifications shall be submitted to the Department's Central District office at 3319 Maguire Boulevard, Suite 232, Orlando, Florida 32803-3767, phone number 407/894-7555.

2. General Conditions: The permittee is subject to and shall operate under the attached General Permit Conditions G.1 through G.15 listed in Appendix GC of this permit. General Permit Conditions are binding and enforceable pursuant to Chapter 403 of the Florida Statutes. [Rule 62-4.160, F.A.C.]

3. Terminology: The terms used in this permit have specific meanings as defined in the corresponding chapters of the Florida Administrative Code.

4. Applicable Regulations, Forms and Application Procedures: Unless otherwise indicated in this permit, the construction and operation of the subject emissions unit shall be in accordance with the capacities and specifications stated in the application. The facility is subject to all applicable provisions of Chapter 403, F.S. and Florida Administrative Code Chapters 62-4, 62-110, 62-204, 62-212, 62-213, 62-296, 62-297 and the Code of Federal Regulations Title 40, Part 60, adopted by reference in the Florida Administrative Code (F.A.C.) regulations. The permittee shall use the applicable forms listed in Rule 62-210.900, F.A.C. and follow the application procedures in Chapter 62-4, F.A.C. Issuance of this permit does not relieve the facility owner or operator from compliance with any applicable federal, state, or local permitting or regulations. [Rules 62-204.800, 62-210.300 and 62-210.900, F.A.C.]

5. New or Additional Conditions: Pursuant to Rule 62-4.080, F.A.C., for good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions, and on application of the permittee, the Department may grant additional time. [Rule 62-4.080, F.A.C.]

6. Expiration: This air construction permit shall expire on January 31, 2003. The permittee, for good cause, may request that this construction/PSD permit be extended. Such a request shall be submitted to the Department's Bureau of Air Regulation prior to 60 days before the expiration of the permit. [Rules 62-210.300(1), 62-4.070(4), 62-4.080, and 62-4.210, F.A.C]

   PSD Expiration: Approval to construct shall become invalid if construction is not commenced within 18 months after receipt of such approval, or if construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable time. The Department may extend the 18-month period upon a satisfactory showing that an extension is justified. [Rules 62-4.070(4), 62-4.210(2) & (3), and 62-210.300(1)(a), F.A.C.]

   BACT Determination: In conjunction with extension of the 18 month periods to commence or continue construction, extension of the permit expiration date, or construction of Phases II and III, the permittee may be required to demonstrate the adequacy of any previous determination of Best Available Control Technology (BACT) for the source as applied to any new or modified emission units. [Rules 62-4.070(4), 62-4.210(2) & (3), 62-210.300(1)(a), and 62-212.400(6)(b), F.A.C.]

7. Modifications: No emissions unit or facility subject to this permit shall be constructed or modified without obtaining an air construction permit from the Department. Such permit must be obtained prior to the beginning of construction or modification. [Rules 62-210.300(1) and 62-212.300(1)(a), F.A.C.]

8. Title V Operation Permit Required: This permit authorizes construction and/or installation of the permitted emissions unit and initial operation to determine compliance with Department rules. A Title V operation permit is required for regular operation of the permitted emissions unit. The owner or operator shall apply for and receive a Title V operation permit prior to expiration of this permit. To apply for a Title V operation permit, the applicant shall submit the appropriate application form, compliance test results, and such additional information as the Department may by law require. The application shall be submitted to the Department's Central District office. [Rules 62-4.030, 62-4.050, 62-4.220, and Chapter 62-213, F.A.C.]

GENERAL EMISSIONS LIMITING STANDARDS

9. General Visible Emissions Standard: Except for emissions units that are subject to a particulate matter or opacity limit set forth or established by rule and reflected by conditions in this permit, no person shall cause, let, permit, suffer, or allow to be discharged into the atmosphere the emissions of air pollutants from any activity, the density if which is equal to or greater than that designated as Number 1 on the Ringelmann Chart (20% opacity). The test method for visible emissions shall be EPA Method 9, incorporated and adopted by reference in Chapter 62-297, F.A.C. Test procedures shall meet all applicable requirements of Chapter 62-297, F.A.C. [Rule 62-296.320(4)(b)1, F.A.C.]

10. Unconfined Emissions of Particulate Matter: [Rules 62-296.320(4)(c) and 62-212.400, F.A.C.]

    (a) No person shall cause, let, permit, suffer or allow the emissions of unconfined particulate matter from any activity, including vehicular movement; transportation of materials; construction, alteration, demolition or wrecking; or industrially related activities such as loading, unloading, storing or handling; without taking reasonable precautions to prevent such emissions.

    (b) Any permit issued to a facility with emissions of unconfined particulate matter shall specify the reasonable precautions to be taken by that facility to control the emissions of unconfined particulate matter.

    (c) Reasonable precautions include the following:

    - Paving and maintenance of roads, parking areas and yards.
    - Application of water or chemicals to control emissions from such activities as demolition of buildings, grading roads, construction, and land clearing.
    - Application of asphalt, water, oil, chemicals or other dust suppressants to unpaved roads, yards, open stock piles and similar activities.
    - Removal of particulate matter from roads and other paved areas under the control of the owner or operator of the facility to prevent reentrainment, and from buildings or work areas to prevent particulate from becoming airborne.
    - Landscaping or planting of vegetation.
    - Use of hoods, fans, filters, and similar equipment to contain, capture and/or vent particulate matter.
    - Confining abrasive blasting where possible.
    - Enclosure or covering of conveyor systems.

    (d) In determining what constitutes reasonable precautions for a particular source, the Department shall consider the cost of the control technique or work practice, the environmental impacts of the

technique or practice, and the degree of reduction of emissions expected from a particular technique or practice.

11. General Pollutant Emission Limiting Standards: [Rule 62-296.320(1)(a)&(2), F.A.C.]

(a) No person shall store, pump, handle, process, load, unload or use in any process or installation, volatile organic compounds or organic solvents without applying known and existing vapor emission control devices or systems deemed necessary and ordered by the Department.

(b) No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor. (Not federally enforceable)

[Note: An objectionable odor is defined in Rule 62-210.200(203), F.A.C., as any odor present in the outdoor atmosphere which by itself or in combination with other odors, is or may be harmful or injurious to human health or welfare, which unreasonably interferes with the comfortable use and enjoyment of life or property, or which creates a nuisance.]

OPERATIONAL REQUIREMENTS

12. Plant Operation - Problems: If temporarily unable to comply with any of the conditions of the permit due to breakdown of equipment or destruction by hazard of fire, wind or by other cause, the permittee shall immediately notify the Department's Central District office. The notification shall include pertinent information as to the cause of the problem, and what steps are being taken to correct the problem and to prevent its recurrence, and where applicable, the owner's intent toward reconstruction of destroyed facilities. Such notification does not release the permittee from any liability for failure to comply with Department rules. [Rule 62-4.130, F.A.C.]

13. Circumvention: No person shall circumvent any air pollution control device or allow the emission of air pollutants without the applicable air pollution control device operating properly. [Rule 62-210.650, F.A.C.]

14. Excess Emissions:

For purposes of this permit, all limits established pursuant to the State Implementation Plan, including those limits established as BACT, include emissions during periods of startup and shutdown, and are not subject to the provisions of Rule 62-210.700(1), F.A.C. This provision can not be used to vary any NESHAP requirements from any subpart of 40 CFR 63. Excess emissions which are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure which may reasonably be prevented during start-up, shutdown or malfunction shall be prohibited pursuant to Rule 62-210.700(4), F.A.C. [Rules 62-4.070(3) and 62-210.700(5), F.A.C.]

Excess emissions resulting from malfunction of any emissions units shall be permitted providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized, but in no case exceed two hours in any 24 hour period unless specifically authorized by the Department for longer duration. [Rule 62-210.700(1), F.A.C.]

COMPLIANCE MONITORING AND TESTING REQUIREMENTS

15. Required Number of Test Runs: For mass emission limitations, a compliance test shall consist of three complete and separate determinations of the total air pollutant emission rate through the test section of the stack or duct and three complete and separate determinations of any applicable process variables corresponding to the three distinct time periods during which the stack emission rate was measured; provided, however, that three complete and separate determinations shall not be required if the process variables are not subject to variation during a compliance test, or if three determinations are not necessary in order to calculate the unit's emission rate. The three required test runs shall be completed within one consecutive five-day period. In the event that a sample is lost or one of the three runs must be discontinued because of circumstances beyond the control of the owner or operator, and a valid third run cannot be obtained within the five-day period allowed for the test, the Secretary or his or her designee may accept the results of two complete runs as proof of compliance, provided that the arithmetic mean of the two complete runs is at least 20% below the allowable emission limiting standard. [Rule 62-297.310(1), F.A.C.]

16. Operating Rate During Testing: Unless otherwise stated in the applicable emission limiting standard rule, testing of emissions shall be conducted with the emissions unit operation at permitted capacity. Permitted capacity is defined as 90 to 100 percent of the maximum operation rate allowed by the permit. If it is impractical to test at permitted capacity, an emissions unit may be tested at less than the minimum permitted capacity; in this case, subsequent emissions unit operation is limited to 110 percent of the test load until a new test is conducted. Once the unit is so limited, operation at higher capacities is allowed for no more than 15 consecutive days for the purpose of additional compliance testing to regain the authority to operate at the permitted capacity. [Rule 62-297.310(2), F.A.C.]

17. Calculation of Emission Rate: The indicated emission rate or concentration shall be the arithmetic average of the emission rate or concentration determined by each of the three separate test runs unless otherwise specified in a particular test method or applicable rule. [Rule 62-297.310(3), F.A.C.]

18. Test Procedures shall meet all applicable requirements of Rule 62-297.310(4), F.A.C. [Rule 62-297.310(4), F.A.C.]

19. Determination of Process Variables: [Rule 62-297.310(5), F.A.C.]

    (a) Required Equipment. The owner or operator of an emissions unit for which compliance tests are required shall install, operate, and maintain equipment or instruments necessary to determine process variables, such as process weight input or heat input, when such data are needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.

    (b) Accuracy of Equipment. Equipment or instruments used to directly or indirectly determine process variables, including devices such as belt scales, weight hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value.

20. Required Stack Sampling Facilities: Sampling facilities include sampling ports, work platforms, access to work platforms, electrical power, and sampling equipment support. All stack sampling facilities must meet any Occupational Safety and Health Administration (OSHA) Safety and Health Standards described in 29 CFR Part 1910, Subparts D and E. Sampling facilities shall also conform to the requirements of Rule 62-297.310(6), F.A.C. [Rule 62-297.310(6), F.A.C.]

21. Test Notification: The permittee shall notify the Department's Central District office and, if applicable, appropriate local program, at least 15 days prior to the date on which each formal compliance test is to begin. Notification shall include the date, time, and place of each such test, and the test contact person who will be responsible for coordinating and having such test conducted for the owner or operator. [Rule 62-297.310(7)(a)9., F.A.C.]

22. Special Compliance Tests: When the Department, after investigation, has good reason (such as complaints, increased visible emissions or questionable maintenance of control equipment) to believe that any applicable emission standard contained in a Department rule or in a permit issued pursuant to those rules is being violated, it shall require the owner or operator of the facility to conduct compliance tests which identify the nature and quantity of pollutant emissions from the emissions units and to provide a report on the results of said tests to the Department. [Rule 62-297.310(7)(b), F.A.C.]

REPORTING AND RECORD KEEPING REQUIREMENTS

23. Duration of Record Keeping: Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least five years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule. [Rules 62-4.160(14)(a)&(b)and 62-213.440(1)(b)2.b., F.A.C.]

24. Test Reports: The owner or operator of an emissions unit for which a compliance test is required shall file a report with the Department on the results of each such test. The required test report shall be filed with the Department as soon as practical but no later than 45 days after the last sampling run of each test is completed. The test report shall provide sufficient detail on the emissions unit tested and the test procedures used to allow the Department to determine if the test was properly conducted and the test results properly computed. As a minimum, the test report, other than for an EPA or DEP Method 9 test, shall provide the applicable information listed in Rule 62-297.310(8)(c), F.A.C. [Rule 62-297.310(8), F.A.C.]

25. Excess Emissions Report: If excess emissions occur, the owner or operator shall notify the Department within one working day of: the nature, extent, and duration of the excess emissions; the cause of the excess emissions; and the actions taken to correct the problem. In addition, the Department may request a written summary report of the incident. Pursuant to the NESHAP requirements, excess emissions shall also be reported in accordance with 40 CFR 63, Subpart A. [Rule 62-4.130, F.A.C.]

26. Excess Emissions Report - Malfunctions: In case of excess emissions resulting from malfunctions, each owner or operator shall notify the Department's Central District office in accordance with Rule 62-4.130, F.A.C. A full written report on the malfunctions shall be submitted in a quarterly report if requested by the Department. [Rule 62-210.700(6), F.A.C.]

27. Annual Operating Report for Air Pollutant Emitting Facility: The Annual Operating Report for Air Pollutant Emitting Facility shall be completed each year and shall be submitted to the Department's Central District office by March 1 of the following year. [Rule 62-210.370(3), F.A.C.]

The following specific conditions apply to the following emissions units:

EMISSIONS UNIT NO.	EMISSIONS UNIT DESCRIPTION
001	Building 101, Lamination & Assembly
002	Building 102, Fabrication
003	Accessory Structures

[Note: Emissions Units 001, 002 and 003 are subject to PSD for VOC; subject to MACT for HAPs; and are subject to the requirements of the state rules as indicated in this permit. This permit includes the MACT requirements, and constitutes MACT for this project.]

OPERATIONAL REQUIREMENTS

1. Production Limits/Hours of Operation: Emissions Units 001, 002 and 003 may each operate for up to 5,000 hours/year. The facility is required to keep daily records of the operating hours. [Rules 62-210.200, Definitions-Potential to Emit (PTE) and 62-213.440(1)(b)1.b., F.A.C.]

MATERIAL USAGE/APPLICATION REQUIREMENTS AND LIMITATIONS

2. VOC and HAP Emissions Limited: Emissions of volatile organic compounds (VOC) including hazardous air pollutants (HAP) shall not exceed 211 tons prior to capture and control; emissions of HAP (including styrene) shall not exceed 149 tons prior to capture and control; and emissions of styrene shall not exceed 125 tons prior to capture and control, in any consecutive 12-month period. [Rules 62-4.070(3), 62-204.800(10)(d)2., and 62-210.200 (PTE), F.A.C., and BACT/MACT]

3. Resins HAP Contents Limits: The weight percentage of total HAP content in resins shall be limited to an aggregate resin maximum average limit (ARMAL) calculated from the following resin component maximum average HAP contents:

   - Production resins (pr), 35% total HAP content.
   - Non-atomized tooling resins (natr), used for making and repair of molds, 39% total HAP content.

   The ARMAL is based on a 3-month rolling average and is calculated using the following equation:

   $$ARMAL = \frac{[(0.35\ WT_{pr}) + (0.39\ Wt_{natr})]}{[(WT_{pr}) + (Wt_{natr})]} \times 100$$

   Where,

   WT_{pr} = Total weight of production resins used in the current month and preceding two months;

   Wt_{natr} = Total weight of non-atomized tooling resins used in the current month and preceding two months.

   [Rules 62-4.070(3) and 62-204.800(10)(d)2., F.A.C., and MACT]

4. Gel Coats HAP Contents Limits: The weight percentage of total HAP content in gelcoats shall be limited to an aggregate gelcoat maximum average limit (AGMAL) calculated from the following gel coat component maximum average HAP contents:

   - Pigmented gel coats (pgc), 33% total HAP content.
   - Base gel coats (bgc), 33% total HAP content.

- Clear gel coats (cgc), 48% total HAP content.
- Tooling gel coats (tgc), used for making and repair of molds, 40% total HAP content.

The AGMAL is based on a 3-month rolling average and is calculated using the following equation:

$$AGMAL = \frac{[(0.33\ WT_{pgc}) + (0.33\ Wt_{bgc}) + (0.48\ Wt_{cgc}) + (0.40\ Wt_{tgc})]}{[(WT_{pgc}) + (Wt_{bgc}) + (Wt_{cgc}) + (Wt_{tgc})\ ]} \times 100$$

Where,

WT_{pgc} = Total weight of pigmented gelcoats used in the current month and preceding two months;

Wt_{bgc} = Total weight of base gel coats used in the current month and preceding two months.

Wt_{cgc} = Total weight of clear coats used in the current month and preceding two months.

Wt_{tgc} = Total weight of tooling gel coats used in the current month and preceding two months.

[Rules 62-4.070(3) and 62-204.800(10)(d)2., F.A.C., and MACT]

5. Sprayed tooling resins HAP Contents Limits (SL): The maximum average weight percentage of total HAP content in sprayed tooling resins, used for the making and repair of molds shall be limited to 30%, based on a 3-month rolling weighted average.
[Rules 62-4.070(3) and 62-204.800(10)(d)2., F.A.C., and MACT]

6. Calculation of weighted average HAP contents:
The weighted average HAP content shall be calculated for each component (i.e., resins, gelcoats, sprayed tooling resins) by multiplying the weight of each material used during the three month period times the total HAP content, in weight percent, of each material, totaling the results, and then dividing the resulting sum by the total weight of all materials used. For example, for the resins component, the 3-month weighted average would be:

$$AVG_r = \frac{[(HAP_{ra})\ WT_{ra} + (HAP_{rb})\ WT_{rb} + \ldots + (HAP_{ri})\ WT_{ri}]}{[WT_{ra} + WT_{rb} + \ldots + WT_{ri}]} \times 100$$

Where,

AVG_r = 3-month weighted average, expressed as a percentage, for the resins component;

HAP_{ri} = Weight percentage of total HAP (expressed as a decimal fraction) in resin i, based on the highest value for each range listed on the Manufacturer's Safety Data Sheets; and

WT_{ri} = Weight of resin i used in the current month and preceding two months.

The 3-month weighted average percentage for the gelcoat component, AVG_g, and the 3-month weighted average percentage for the sprayed tooling resin component, AVG_s, shall be likewise calculated.

[Rules 62-4.070(3) and 62-204.800(10)(d)2., F.A.C., and MACT]

7. Records of Weighted Average HAP Contents Required: The permittee shall keep and maintain the following records to demonstrate compliance with the HAP content limitations of the previous specific condition. Records shall be completed no later than five working days after the end of each month.
   - Weight in pounds of each material used each month.

- Weight percentage of total HAP (expressed as a decimal fraction) in each material using the highest value for each range listed on the Manufacturer's Safety Data Sheets.
- Rolling 3-month limits: ARMAL, AGMAL, and SL, expressed as weight percentages.
- Rolling 3-month weighted average total HAP contents: AVG_r, AVG_g, AVG_s, expressed as weight percentages, based on the materials used in the current month and preceding two months.

[Rules 62-4.070(3) and 62-204.800(10)(d)2., F.A.C., and MACT]

8. Resin & Gel Coat Cleaning Solvents: The owner or operator shall only use resin and gel coat cleaning solvents which contain no HAP. If solvent cleaning machines are used, they must comply with the requirements of 40 CFR 63 Subpart T – Halogenated Solvent Cleaning. A solvent cleaning machine means device or piece of equipment that uses halogenated HAP solvent liquid or vapor to clean the surfaces of materials. Buckets, pails, and beakers with capacities of 7.6 liters (2 gallons) or less are not considered solvent cleaning machines. Halogenated HAP solvents are: methylene chloride, perchloroethylene, trichloroethylene, 1,1,1,-trichloroethane, carbon tetrachloride, and chloroform. [Rules 62-4.070(3) and 62-204.800(10)(d)2., F.A.C., and MACT]

9. Carpet and Fabric Adhesives: The permittee shall use carpet and fabric adhesives that contain no HAP. Excluded from this limit are aerosol adhesives. [Rules 62-4.070(3) and 62-204.800(10)(d)2., F.A.C., and MACT]

10. Non-Atomizing Equipment Required: The owner or operator shall only use non-atomizing application equipment for production resins. Sea Ray shall submit an operation and maintenance plan and operator training plan including but not limited to equipment calibration methods to achieve maximum HAP reduction. [Rules 62-4.070(3) and 62-204.800(10)(d)2., F.A.C., and MACT]

11. No Controls Required: The owner or operator is not required to control emissions of HAP from mold sealing, releasing, stripping and repair materials. The owner or operator is not required to control emissions of HAP from coating processes for exterior wood parts. [Rules 62-4.070(3) and 62-204.800(10)(d)2., F.A.C., and MACT]

12. Non-Structural Interior Wood Parts: The owner or operator shall comply with 40 CFR 63 Subpart JJ – NESHAP for Wood Furniture Manufacturing Operations for carpentry adhesives and non-structural interior wood parts (e.g., cabinets, furniture and trim). [Rules 62-4.070(3) and 62-204.800(10)(d)2., F.A.C., and MACT]

13. Bottom Coatings & Other Exterior Coatings: The owner or operator shall only use bottom coatings and any other exterior coatings (except for wood parts) which are compliant with 40 CFR 63 Subpart II – NESHAP for Ship Building and Ship Repair (Surface Coating). [Rules 62-4.070(3) and 62-204.800(10)(d)2., F.A.C., and MACT]

CONTROL SYSTEMS REQUIRED/EMISSIONS LIMITS

14. Odor Prevention Measures Required: To prevent odors from escaping at ground level, Emissions Unit 001 (Lamination/Assembly Building) shall be properly ventilated under negative pressure. "Properly ventilated under negative pressure" means no venting of air from the building's interior except through a single stack, the top of which is at least 75 feet above ground elevation and which discharges air from the building at a minimum stack velocity of 70 feet per second. In the event a zoning variance is not approved by Brevard County for a 75-foot stack, an alternative stack/velocity design shall be submitted

to the Department for approval. At all times during lamination processing, and for at least two hours after the last application of resin or gel coat, Emissions Unit 001 shall be operated under negative pressure as specified above and the stack discharge velocity continuously measured and recorded. Emissions Unit 001 shall be equipped with a system that will prevent the detection of objectionable odors beyond the permittee's property line.

15. Ambient Monitoring/Odor Testing Required: Prior to the commencement of lamination processing, the permittee shall conduct ambient monitoring to detect and record styrene emissions. Ambient monitoring shall be conducted once a week during the operation of the Lamination/Assembly Building. The monitoring shall be done on the first day of the business week that the wind blows in the direction of the Island Crossing and Riverwalk neighborhoods between the hours of 6:00 a.m. and 8:00 a.m.; otherwise, the monitoring shall be conducted on Thursday regardless of the wind direction. The monitoring shall be conducted for at least 30 months starting within 30 days after issuance of this permit. Cessation of the ambient monitoring requirement after the 30 month period shall require Department approval and shall depend upon the number and nature of complaints registered by neighbors over the 30-month period. The ambient monitoring shall be conducted using EPA Method TO14. The ambient monitoring location shall be selected jointly by the Department and representatives of the local residential community. The ambient monitoring data shall be made available for inspection by the Department and/or authorized representatives of the local residential community as reasonably requested. "Authorized representatives of the local residential community" means any member of a single board or council established by local homeowners for this purpose. [Rules 62-296.320(1)(a)&(2) and 62-210.200(203), F.A.C.]

16. Odor Testing. Within 90 days after commencement of operation of the lamination building, permittee shall conduct an odor test to confirm that no odors can be detected when one volume unit of ambient air (at the property boundary) is mixed with 7 volumes of odorless air based on ASTM Method E769-91. [Rule 62-296.320(2), F.A.C.; Applicant Request]

17. Evaluation of Odor Control (Destruction) Technology Required Initially: An initial requirement shall be the immediate evaluation of state-of-the-art enzyme bioaerosol odor destruction technology for the Cape Canaveral plant. This technology shall be evaluated with the objective of removing approximately 70 to 80 percent of the styrene from the Lamination/Assembly Building exhaust air. To determine the technical and economic feasibility of the technology, the permittee shall, within 60 days after issuance of this permit, conduct special feasibility tests consisting of injecting test solutions into the ventilation system at its existing Merritt Island boat manufacturing plant and measuring the destruction of styrene. The styrene destruction results shall be provided to the Department's Bureau of Air Regulation within 14 days after completion of the tests. If the feasibility tests at the existing Merritt Island plant demonstrate to the Department's satisfaction that styrene control technology would be technically feasible and cost effective at the Cape Canaveral site, the Department may propose to revise this permit, as provided under Condition II.5, to require that the permittee install a full-scale system based on this technology and have it operating properly prior to the initial commencement of lamination processing. The Department shall modify this permit as provided under Condition II.5 to include operating, testing and compliance parameters for this system and no other air pollution control equipment shall be required. [Rules 62-296.320(1)(a)&(2), 62-210.200(203), and 62-4.070(3), F.A.C.]

18. Pilot Plant Required if Odor Destruction Not Feasible: If enzyme bioaerosol destruction technology is

shown not to be technically and economically feasible on the basis of the Department's evaluation of the feasibility tests, then, as an additional requirement, within 120 days following the commencement of lamination processing, the permittee shall submit a proposed design for a pilot-scale VOC and/or HAP (VOC/HAP) capture and control system to the Department's Bureau of Air Regulation for approval. The pilot-scale system shall be sized to capture for treatment at least 10,000 cfm of VOC/HAP-laden air exhausted from a single boat hull of at least 65 feet in length. The design submittal shall contain all data necessary to evaluate the system's performance capabilities for arriving at a net overall VOC/HAP capture and destruction efficiency of 76 percent for Emissions Unit 001. The pilot-scale control system may utilize one or more of the following approaches for a selected area of hull lamination processing within the Lamination/Assembly building: a localized pickup system, a permanent booth enclosure or a movable-enclosure venting and capture system. The Department shall notify the permittee within 30 days of receipt of the design proposal as to whether it will be accepted. If the proposal is not approved, the Department shall notify the permittee within the same 30 day period as to what changes are required to make the proposal acceptable. Construction of buildings and installation of process equipment, including the pilot plant control project, may begin upon issuance of the PSD permit. Lamination processing may begin at any time thereafter provided that 15 days advance written notification is provided to the Department's Bureau of Air Regulation in Tallahassee and the Department's Central District Office in Orlando. [Rules 62-296.320(1)(a)&(2), 62-210.200(203), 62-4.070(3), 62-212.400, F.A.C., and BACT]

19. Testing and Evaluation of Pilot Plant Required: The permittee shall commence operation of the pilot-scale control system within 180 days following the approval of the pilot system design by the Department. The permittee shall provide written notice of the lamination commencement date to the Bureau of Air Regulation and the Department's Central District Office. Monthly progress reports detailing the status of the pilot project shall be submitted to the Bureau by the permittee during the construction period. The permittee shall notify the Bureau and the Department's Central District Office at least 15 days in advance of the startup date of the pilot project. Within 180 days following commencement of operation of the pilot system, and after notifying the Bureau and the Central District Office at least 15 days in advance, the permittee shall have conducted a capture efficiency test and a VOC/HAP destruction efficiency test on the system according to the procedures specified below in Specific Conditions No. 26 and 27 and shall have presented the results of these tests along with a cost effectiveness determination to the Department. The permittee is authorized to continue operating the lamination building following the conclusion of the pilot system testing and shall be given a reasonable amount of time to conform to any new requirements imposed as provided under Condition 20. [Rules 62-4.070(3) and 62-212.400, F.A.C., and BACT]

20. Full-Scale VOC/HAP Controls Required if Pilot Plant Demonstrates Feasibility: Unless the test results or other data provided by the permittee convince the Department that a full-scale system is not feasible from a technical, operational or cost standpoint, the Department will propose (as provided under Condition II.5.) that the permittee install a full-scale VOC/HAP control system for the entire Lamination/Assembly Building. The Department's proposal will include a revised BACT determination, which will be subject (in its entirety), to the protections provided under Condition II.5. The permittee shall begin its operation of the full-scale system within twelve months from the date of the submission of test results from the pilot-scale project. The full-scale control system may augment or replace the pilot system and shall be designed to capture at least 90 percent of the total VOC/HAP emissions generated from the hull and deck lamination process while destroying at least 95 percent (85.5 percent minimum overall capture and destruction). The full-scale control system shall be

operated at the maximum capture rate demonstrated by the pilot-scale control system. Appropriate emission limits and compliance requirements for the full-scale VOC/HAP control system shall be established by the Department within 45 days following receipt of test results for pilot-scale system and shall be incorporated into the Title V permit for this facility (as provided under Condition II.5). [Rules 62-4.070(3) and 62-212.400, F.A.C., and BACT]

21. Removal of Pilot Plant Control System if Not Feasible: If the Department determines that a full-scale VOC/HAP capture and control system is not feasible, the permittee shall be allowed to remove the pilot-scale control system following publication by the Department of a public notice of such action in a newspaper of general circulation in the area in accordance with Rule 62-210.350(1) and (2), F.A.C. However, the permittee shall continue to comply with the Department's odor control rules. [Rules 62-4.070(3), 62-296.320, and 62-212.400, F.A.C.]

22. Public Notice: After the Department analyzes the test results and other data from the pilot-scale project to determine the feasibility of full-scale controls and revises its BACT determination accordingly, the Department will provide notice and an opportunity for hearing. The notice shall be published in accordance with Rule 62-210.350(1) and (2), F.A.C. The determination of what constitutes BACT will be subject (in its entirety) to the procedures under Condition II.5. [Rules 62-4.080 and 62-212.400, F.A.C.]

23. PM/PM_{10} Control System Required: The woodworking operations of Emissions Unit 002 shall be equipped with a local exhaust ventilation system ducted to a fabric filter to capture and control emissions of particulate matter. The opacity of the building exhaust shall be limited to 5 percent. [Rule 62-4.070(3), F.A.C.]

24. No Air Outflow Through Doors and Openings Allowed. The Lamination/Assembly Building air ventilation system shall be designed so that whenever any doors or openings are either partially or totally open the total air volume exhausted through the "pull side" air fans shall always exceed the total volume entering from the "push side" air fans by a minimum of 10 percent. Fan motor amperages for all Lamination/Assembly Building ventilation fans shall be continuously monitored and recorded to show compliance with this requirement. [Rule 62-4.070(3), F.A.C.]

25. Air Outflow Prevention Design and Operation Plan Required: Pursuant to the requirements of Specific Condition 24 above, and 45 days prior to the initial operation of the lamination process, the permittee shall submit its Air Outflow Prevention Design and Operation plan for the Lamination/Assembly Building to the Department for approval. The plan shall identify the final ventilation design air flows for the push and pull sides and show in detail how the fan motor amperages will be monitored and recorded. [Rule 62-4.070(3), F.A.C.]

COMPLIANCE MONITORING AND TESTING REQUIREMENTS

26. Capture Efficiency Demonstration: Pursuant to the requirements of Specific Condition 19, the permittee shall demonstrate the capture efficiency of the pilot plant pickup system by comparing raw VOC/HAP emissions generated over a six-hour lamination period (based on material usage rates and appropriate emission factors) with captured emissions based on measured flow rates and VOC concentrations in the exhaust duct as determined by EPA Methods 2 and 18, 25 or 25A, as described in 40 CFR 60 Appendix A (1997 version). Within 90 days following commencement of operation of the full scale control system required by Specific Condition 20 above, the same capture efficiency demonstration shall be performed on the full scale control system after providing 15 days written

notification to the Bureau of Air Regulation and the Central District Office. [Rule 62-4.070(3) and 62-212.400, F.A.C., and BACT]

27. Destruction Efficiency Test: Pursuant to the requirements of Specific Condition 19, the permittee shall determine the destruction efficiency of the pilot plant control system by sampling the inlet and outlet of the destruction device over a three-hour lamination period for VOC concentrations using EPA Method 18, 25 or 25A, as described in 40 CFR 60 Appendix A (1997 version). The same requirement shall apply to the full scale control system as specified in Specific Condition 20 above. [Rules 62-4.070(3) and 62-212.400, F.A.C., and BACT]

28. PM Testing Required: Visible emissions from Emissions Unit 002 shall be tested initially and annually using EPA Method 9. [Rule 62-4.070(3), F.A.C.]

REPORTING AND RECORD KEEPING REQUIREMENTS

29. Records of Emissions Required: The permittee shall continuously keep and maintain a five-year ongoing compilation of the following records to demonstrate compliance with the VOC and HAP emissions limitations of Specific Condition No. 2 of this section. Records shall be completed no later than five working days after the end of each month.
    - Amounts in pounds of each material used each month that contains VOC and/or HAP.
    - Weight percentage of HAP in materials using the highest value listed on Manufacturer's Safety Data (MSD) Sheets. For non-HAP VOC the mid-point value may be used.
    - Amount in pounds of VOC/HAP emitted each month from each material used during the month, calculated by multiplying the amount of each material used by its VOC/HAP content and then by the appropriate emission factor. The permittee may use emission factors contained in *Table Three: Proposed Emissions Calculations*, submitted as part of the permittee's MACT application dated July 16, 1999.
    - Total amount in pounds of VOC/HAP emitted each month, calculated as the sum of VOC/HAP emitted from each material used during the month as determined above.
    - Rolling 12-month total amount in pounds and tons of VOC/HAP emitted in the most recent consecutive 12-month period, calculated as the sum of VOC/HAP emitted for the current month and the preceding eleven months.

    [Rules 62-4.070(3), 62-212.400, F.A.C., MACT and BACT]

PROVISION FOR FUTURE EPA SECTION 112(D) MACT DETERMINATION

30. At such time as the U.S. EPA promulgates final regulations in 40CFR63 establishing standards for the Boat Manufacturing Industry, and the Department adopts such standards into its rules, the permittee may provide reasonable assurances of its ability to comply with the "new source" standards and may then, for purposes of MACT compliance, comply with any less restrictive specific provision of the promulgated MACT for "new" sources rather than the more restrictive specific provisions of the case-by-case MACT. However, if this change results in a modification, as defined by the State Implementation Plan (S.I.P.), it shall be processed as a permit revision in accordance with the S.I.P. In any event, the new source MACT when adopted shall be the BACT floor for PSD purposes in the event that the Department must reconsider the BACT provisions of this permit.

The BACT/MACT Determination is attached as part of this permit following this page.

The NESHAP General Provisions is attached as part of this permit following this page.

APPENDIX C. APPLICANT'S TABLE 3 – EMISSIONS CALCULATIONS

The Applicant's Table 3, Proposed emissions calculations, is attached as part of this permit following this page.

136354.2

FINAL DETERMINATION
SEA RAY BOATS, INC.
Merritt Island Facility
Cape Canaveral Plant
Permit No. 0090093-003-AC
PSD-FL-274

An Intent to Issue Air Construction Permit to Sea Ray Boats, Inc. for the construction of a fiberglass boat manufacturing plant in Cape Canaveral, Brevard County, Florida was distributed on October 7, 1999. The proposed permit covered the construction of a new plant to expand the applicant's Merritt Island facility by adding production capability for larger boats. The proposed Cape Canaveral plant is designed to produce approximately 80 boats per year in the sixty-five to seventy foot range and will be a major source of emissions of Volatile Organic Compounds (VOC) and Hazardous Air Pollutants (HAP) including styrene. This chemical is used in the lamination process and its emissions are a source of public concern regarding its objectionable odor as well as its potential adverse health effects from ambient exposure levels in nearby neighborhoods.

The Public Notice of Intent to Issue Air Construction Permit was published by the Department in the Florida Today newspaper on October 31, 1999. Copies of the draft construction permit and related documents were available for public inspection at the Department's offices in Tallahassee and Orlando and at the Brevard County Office of Natural Resource Management in Viera.

During the Department's public meeting on November 17, 1999 in Viera, and during the 30-day public comment period ending on November 30, many comments were received from the public opposing the issuance of the permit. Commenters requested that the permit be denied, or in the alternative, that the plant be required to have full emission controls at startup rather than the Department's proposed pilot-scale controls initially followed by total controls installed within a three year period after startup (if economically and technologically feasible). A summary of the public's comments has been attached to this Final Determination.

In addition to the many comments from the public, comments were also received from the National Park Service, the U.S. Environmental Protection Agency, Eastern Research Group, Inc., the National Marine Manufacturers Association, and the applicant. All of these comments are addressed below:

Public's Comments: (Due to their large number, these comments have been summarized and grouped by issues)

Issue: Permit Denial vs. Issuance

Commenters stated that the permit should be denied on the basis of the Department's existing rule prohibiting the discharge of air pollutants that cause or contribute to an objectionable odor (Rule 62-296.320(2), F.A.C.). Following the issuance on October 7, 1999 of an Intent to Issue the proposed permit, Department staff were heading east on Sea Ray Drive just off of SR 528 preparing to visit the site of Sea Ray's new construction on November 17, 1999 when each of them became highly aware of the odor of styrene that penetrated the automobile. Since there are no other styrene emitters in that area, the styrene was believed to have come from the existing Merritt Island facility operated by the applicant. Thus, the odor problem the public complains of was witnessed first-hand and documented by the Department. The severity of the odor situation had not been made known to the department prior to issuing the Intent to Issue.

Response:

As a result of the large number of public complaints and comments, the Department has revised its permitting approach. Instead of viewing the odor problem and the HAP emissions (styrene) as concomitant problems to be addressed in the pilot program, the Department will require that Sea Ray take measures

initially that will prevent objectionable odors going beyond its property line. The basis for this change is Rule 62-296.320(2), Florida Administrative Code. Pursuant to this rule, permit conditions have been added that will make continued operation of Sea Ray's new plant contingent upon the avoidance of objectionable odors being experienced in the local neighborhoods. The originally-proposed pilot-scale program for capturing and destroying styrene vapors will also be required allowing Sea Ray to have a period of between two and three years to demonstrate the feasibility of controls on a small scale before implementing them at full-scale (if economically and technologically feasible). The rationale for the change in approach is that odor controls can be required independently from the Department's Determination of Best Available Control Technology made pursuant to the federal Prevention of Significant Deterioration regulations (40CFR52.21) and the corresponding state regulations (Rule 62-212.400, F.A.C.). Those regulations require that cost effectiveness be considered in the determination of Best Available Control Technology.

Many commenters requested that the permit be denied outright. By law, as long as all requirements of the Department's rules and permit conditions are met and the applicant has not indicated by past or present actions that it will not abide by said rules and permit conditions, the Department must issue the permit. One of the aforesaid requirements is that the applicant must provide the Department with reasonable assurance that it can and will comply with all conditions of the final permit. Although the applicant has not provided such reasonable assurance totally on its own, the Department, through its own research, now has reasonable assurance that styrene air concentrations will be reduced to acceptable levels in the areas surrounding the new plant site. The Department's reasonable assurance is based, in part, on the combination of modifications to the building ventilation system (negative pressure-no air outflow) and exhaust stack design (single stack-high velocity discharge for greater dispersion).

Issue: Sea Ray's Pre-Permit Construction Activities

Several commenters questioned whether Sea Ray should have been allowed to begin construction of buildings at the Cape Canaveral site prior to obtaining a construction permit from the Department.

Response:

This issue was explained at the public hearing by the Department's Central District Office staff. Essentially, upon learning of the construction, the Central District Office told Sea Ray that it should not construct any facilities that could be used to generate emissions of air pollutants. Sea Ray replied that the construction going on involved only an office building and a warehouse. Sea Ray was then authorized to complete the construction of the office and warehouse buildings but to cease all other construction activities. The PSD rules do allow certain pre-construction activities such as clearing of the site prior to obtaining a PSD permit, but construction of facilities that enable an owner or operator to generate emissions of air pollutants may not be commenced until the permit is obtained. Construction of such facilities at Sea Ray's new site has been stopped and will not be allowed to resume until the permit has been issued. Therefore, this issue has been resolved.

Issue: Appropriateness of the original BACT Determination

Several commenters raised the issue of whether full controls should be required initially. They suggested that the pilot plant approach would endanger the health of nearby residents by prolonging the timetable for installation of full-scale air pollution controls. Their concern arises from the status of styrene as both an EPA-listed hazardous air pollutant and a "potential carcinogen" as classified by the International Agency for Research on Cancer. Some commenters also stressed concern about possible genotoxic effects of styrene exposure, citing studies reported in the medical literature.

Response:

The Department is aware that a number of medical studies have concluded that styrene can and does cause mutagenic and other damage to humans as a result of varying levels of occupational exposure. These effects reportedly can result from exposure levels as low as 18 PPM in the workplace. However, the exposure levels that will be incurred by nearby residents will be far lower, in all likelihood as low as a few parts per billion (ppb). Although this is a very low level of exposure, unfortunately there is no conclusive

evidence to indicate what level of ambient exposure might be harmful to nearby residents. The U.S. Environmental Protection Agency has established an air Reference Concentration (RfC) for styrene that is intended to indicate concentration levels at which no adverse health effects are known or suspected to occur in humans. For styrene, this level is 1,000 micrograms per cubic meter (approximately 235 ppb). Air pollution dispersion models indicate that, under the revised permit conditions, ambient concentrations of styrene from the proposed Cape Canaveral Plant should be less than the styrene odor detection threshold at Sea Ray's property line as a worst case estimate.

Eastern Research Group's comments:

Issue: Appropriateness of comparing Sea Ray's new plant with Bombardier

The Eastern Research Group, Inc., (ERG) submitted its comments to the EPA instead of the Department but they will be addressed since the EPA forwarded them to the Department. The ERG pointed out that EPA's revised MACT model point value equations are based on more current data than the original point value table that the Department used in its BACT determination and therefore should be used for comparing the Bombardier facility with Sea Ray's new plant. However, after applying the revised values, the ERG found that the Department's conclusion about Bombardier's plant being "best controlled" is still valid, with the existing line having a point value of 242 lb/ton and the new line achieving 36 lb/ton. Combining these separate line values results in a facility value of 88 lb/ton compared to the existing source MACT floor value of 91 lb/ton. Yet, the ERG stated that since the performance of Bombardier's control device had not been confirmed as of the date of EPA's MACT proposal, the EPA removed the Bombardier facility from its MACT analysis.

Response:

Whereas the EPA grouped the existing uncontrolled line at Bombardier's plant into its MACT analysis, resulting in a higher "facility" emission factor, the Department's approach was based on comparing "new source MACT" with BACT for a new facility. The Department believes that to include Bombardier's existing line in an evaluation of new source control technology is "mixing apples and oranges" and creates the false notion that a BACT determination should not consider the control technology employed in Bombardier's facility.

National Marine Manufacturers Association's (NMMA) comments:

Issue: Concern about this BACT affecting future boat building BACT/MACT Determinations

The boat manufacturers association expressed concern about the Sea Ray BACT/MACT determination setting a 'BACT floor' for other boat builders. It took issue with the Department's reference to the Bombardier plant in Benton, Illinois as a 'best controlled plant' that could be used as a basis for requiring controls for Sea Ray's plant. NMMA's argument is essentially that since Sea Ray makes boats that are three times longer with deeper hulls than those built by Bombardier, it is therefore improper to assume that extrapolations can be made about emission control equipment for the two facilities. NMMA attempts to bolster this argument by pointing out the differences in processing techniques such as use of robotic resin application equipment, intermittent incineration requirements, and the unique tunnel enclosure design used at the Bombardier facility.

Response:

The Department stated in its BACT determination that the aforementioned differences are not sufficient to rule out a similar capture and control system at Sea Ray. This is still the case after reviewing comments by Sea Ray and the NMMA. Clearly, no evidence has been presented to show that a control system similar to Bombardier's cannot be installed in Sea Ray's plant in a cost-effective manner. In fact, the cost estimates reviewed by the Department indicate that such a control system would be cost-effective.

Issue: Whether commonly available enclosures designed for paint spray operations can be effectively applied for styrene capture in boat manufacturing

The NMMA objected to the idea that a commonly-used paint spray booth enclosure could be applied in conjunction with a control device for capturing and destroying styrene emissions from the boat lamination process. The NMMA stated that this a "technically irrelevant" discussion, evidently for the reason that the enclosure illustrated in the BACT determination was actually capturing paint emissions rather than styrene.

Response:

The Department's discussion of the paint spray booth enclosure depicted in the BACT determination clearly explains that it is used for paint spraying operations but that it can be easily adapted for the boat lamination process and mounted on wheels if necessary. Therefore, the NMMA's comment about paint booths not being applicable misses the point of the BACT discussion which is that paint spraying enclosures could be easily adapted for boat lamination processing.

Issue: Whether incineration would be effective at concentrations well below the flammability limit

The NMMA stated, "...the problem with incinerating styrene is achieving a high enough concentration so that it will burn. The lower flammability limit for styrene is 11,000 PPM. ...When ventilating the work area to achieve the levels necessary to meet the worker exposure limits, the vapor concentration levels passing through the plenum of the incinerator would be less than 1% of the lower flammability limit. To operate an efficient incinerator system requires much higher concentrations. ... ".

Response:

The NMMA's discussion of styrene concentrations being below flammability limits (and therefore too low to properly incinerate) is misplaced from an engineering standpoint because this is not a case where styrene is being burned as a fuel. Rather, the process of incineration involves the thermal destruction of an organic substance, which does not depend upon flammability limits. Lower flammability limits refer to the concentration below which a combustible component in a gaseous mixture such as air will not support combustion to the extent that flame is self-propagating through it. Likewise, an upper flammability limit or concentration exists above which combustion would not be self-propagating. Simply stated, this means that there are lean and rich boundary limiting compositions beyond which flame will not propagate. These limits for styrene are 0.9 to 6.8% by volume, respectively. However, flame propagation is not required for thermal destruction mechanisms that occur in an oxidizer. Thermal destruction occurs as a result of the high temperatures to which organic substances are exposed for the required time and the resulting breakdown of molecular bonds such that the hydrocarbon is directly oxidized. Hydrocarbons ordinarily will oxidize beginning at 1100 - 1200°F, forming relatively high amounts of CO, while reaching ideal conversions to CO_2 at around 1350 – 1400°F. Catalytic oxidizers accomplish destruction through the use of catalysts that lower the activation energy necessary for the molecules to react.

Where flammability limits do enter the picture in choosing a VOC control system (thermal vs. catalytic oxidizer or other technology) is in the area of operating costs for auxiliary fuel. Generally, if the VOC concentration is greater than the upper explosive limit, incineration is definitely not appropriate and carbon adsorption may be the proper choice. If the VOC concentration is above 50% of the mixture's lower explosive limit (LEL), safety considerations generally dictate that technologies other than incineration be considered. If the concentration is less than 50% of the LEL, incineration is appropriate. However, where very low concentrations exist, as here, auxiliary fuel must be supplied for either thermal or catalytic incineration. Thus, the primary consideration in incinerating very low concentrations of VOCs is whether the fuel cost can be justified on the basis of accepted ranges for cost effectiveness (dollars per ton removed). In the case of styrene abatement, tests on a commercially available rotary concentrator installed in a plastics plant have demonstrated that styrene can be efficiently recovered from ventilated work areas at concentrations below 50 PPM and elevated to practical incineration levels for cost effective destruction in a regenerative thermal oxidizer.

Sea Ray's comments:

Issue: What Sea Ray proposes to do in response to the public's comments

Following the public meeting and receipt of public comments, Sea Ray met with the Department and proposed a revised design of the lamination building exhaust system. The revised design will involve maintaining a negative pressure at all times in the lamination building. Also, the various rooftop emission points will be combined into a single discharge stack while injecting additional air at the base of the common stack so that a minimum stack velocity of 70 feet per second is maintained at all times while the lamination process is in operation. According to air dispersion modeling calculations, this stack velocity, combined with increasing the stack height by five feet, will effectively cause dissipation of the styrene component to levels below the styrene odor threshold in the areas surrounding the new plant. Sea Ray further proposed masking of the odor by injecting chemical substances into the stack discharge air that will overcome the distinctive odor of styrene.

Sea Ray also submitted a document that assesses the health risk of ambient exposure to styrene in the vicinity of Sea Ray's proposed plant. The report concludes:

> "In response to concerns that have been expressed regarding the potential health risks that may be associated with air emissions of styrene from the proposed Cape Canaveral plant of Sea Ray Boats, Inc., modeling and risk evaluation activities have been conducted. Long and shorter term projected air concentrations are in the range where some odor may be detectable from time to time at or beyond the property boundary. However, in all instances the projected styrene air concentrations are well below those which would cause any health effects to local residents, including potentially more sensitive individuals."

The report also stated:

> "The projected average and maximum annual average air concentrations at the property boundary and at the nearest residential property boundary ranges from 61.5 to 73 ppb (average of 65.7 ppb). These values for the residential property are in the range of those reported for odor thresholds of 10-150 ppb, but are on the low end of the detectable range based on most reported studies. These predicted concentrations at the closest residential property boundary may explain why some complaints of odor in the vicinity of the Sea Ray plant have occurred in the past. However, as discussed in Section III of this report, the annual average values are all at least 65 times lower than the reference concentration of 235 ppb established by the U.S. EPA as the concentration that is likely to be without an appreciable risk of deleterious effects during a life time of exposure. Thus, while odor may be detected from time to time, this does not mean that a health risk is associated with those odors. Sea Ray has operated in their present location in the Merritt Island community for over 27 years. While odor complaints have occasionally been received, they are irregular short-term events generally related to specific weather conditions. The low level at which styrene can be detected by odor is much less than the level associated with any health effects. Therefore, this information suggests that the air modeling data are a reasonable representation of conditions at and near the plant site."

Response:

The Department evaluated Sea Ray's proposed design revision and their air dispersion modeling results. In addition, the Department consulted EPA's Reference Guide to Odor Thresholds for Hazardous Air Pollutants Listed in the Clean Air Act Amendments of 1990, EPA/600/R-92/047. The best available EPA-peer reviewed and -approved information on odor thresholds for styrene are contained in this document. Two types of odor thresholds are evaluated in this document: the *detection* threshold and the *recognition* threshold. The *detection* threshold is the lowest concentration of odorant that will elicit an

olfactory response without reference to odor quality in a specified percentage of a given population. The *recognition* threshold is defined as the minimum concentration that is recognized as having a characteristic odor quality by a specific percentage (usually 50%) of the population. The difference in concentration between detection and recognition thresholds can vary from approximately two to ten times. In the case of styrene, the EPA-accepted detection threshold value is 73 ug/m^3 (17 ppb) and the recognition threshold value is 640 ug/m^3 (150 ppb). Sea Ray compared their modeling results to the odor recognition threshold value of 640 ug/m^3. In order to provide further assurance that the public's objectionable odor concerns have been adequately addressed, the Department did additional modeling, which included varying stack heights and stack velocities in order to arrive at an optimum combination of stack parameters that would result in the lowest reasonably achievable predicted styrene impacts. The Department compared its modeling results to the lower detection threshold value of 73 ug/m^3. This modeling showed maximum predicted 1-hour impacts of about 100 ug/m^3 with a 75-ft stack and a 70 ft/sec exhaust stack velocity. The 75-ft stack and 70 ft/sec stack exhaust velocity will be the permitted values. If a variance from the zoning ordinance necessary for a 75-ft stack is not received from Brevard County, then ambient concentrations of styrene may be greater and the styrene odors may be detectable under certain atmospheric conditions. Based on these stack parameters the dilution is down near the detection level and is six times below the recognition threshold level. In addition, the Department did modeling to evaluate the predicted percentage of time that styrene emission impacts would be above the detection threshold, both in an area surrounding the proposed facility and in the adjoining neighborhood to the south. Impacts greater than the detection threshold are predicted to occur less than 7% of the time throughout a 2 km area surrounding the facility and less than 1 % of the time in the adjoining neighborhood. In the event that objectionable odors persist, this permit contains further measures that will be put in place to reduce odor impacts.

While masking of the styrene odor is utilized by Sea Ray at other manufacturing sites, the Department believes that, due to the proximity of the Cape Canaveral site to a residential area, a way should be found to eliminate the styrene odors rather than masking them. Masking reduces the perception of the odor problem but does not destroy the cause of the odor. According to Sea Ray's representatives, some of the neighbors do not want the odors masked. The Department has learned that it may be practical to install new odor destruction technology at the Sea Ray site that will actually destroy the styrene using enzyme bioaerosol technology. This technology involves injecting an atomized spray into the duct system ahead of the discharge stack. The solution acts to destroy the styrene through biodegradation and catalytic oxidation. Reports indicate that only a few seconds of contact time are required to achieve significant reductions in the concentration of organic contaminants. The revised permit includes a requirement that Sea Ray investigate the feasibility of this technology by having a special test performed at the existing Merritt Island plant within 60 days after receiving the final construction permit for the Cape Canaveral site. The time required to complete these special tests would be approximately two months. If the tests indicate that the technology is technically feasible and cost-effective, Sea Ray will be required to use it for the Lamination/Assembly Building at the Cape Canaveral plant beginning with the very first day of lamination processing. If the special test at the existing Merritt Island plant does not demonstrate conclusively that the new technology is technically feasible and cost-effective, then the originally proposed pilot-scale control project will be required as indicated in the final permit. If it is concluded from the test that the enzyme bioaerosol technology is technically feasible and cost-effective for destroying styrene, then it shall be installed on the Cape Canaveral Lamination/Assembly Building exhaust and no other air pollution control equipment shall be required.

Another condition that has been incorporated into the permit requires ambient monitoring for styrene. Prior to the commencement of lamination processing, Sea Ray must conduct ambient monitoring to detect and record styrene emissions. Ambient monitoring will have to be conducted once a week during the operation of the lamination building. The monitoring will be done on the first day of the business week that the wind blows in the direction of the Island Crossing and Riverwalk neighborhoods between the hours of 6:00 a.m. and 8:00 a.m.; otherwise, the monitoring will be conducted on Thursday regardless of the wind direction. The monitoring will be conducted for at least 30 months starting within 30 days after issuance of

this permit. Cessation of the ambient monitoring requirement after the 30-month period will require Department approval and will depend upon the number and nature of complaints registered by neighbors over the 30-month period. The ambient monitoring will be performed at a location selected jointly by the Department and representatives of the local residential community. "Authorized representatives of the local residential community," means any member of a single board or council established by local homeowners for this purpose. In addition, within 90 days after commencement of operation of the lamination building, the permittee will be required to conduct an odor test to confirm that no odors can be detected when one volume unit of ambient air (at the property boundary) is mixed with 7 volumes of odorless air based on ASTM Method E769-91.

To provide further assurances that Sea Ray's neighbors will have knowledge of any styrene emissions that may be carried across State Road 528 into their neighborhoods, the Department plans to set up, for a limited time, a Differential Optical Absorption Spectroscopy (DOAS) system that will continuously detect styrene emissions and record their concentrations in the ambient air. This system utilizes the variations in optical absorption characteristics of various substances when a light source is beamed across a specific linear path. It will specifically identify styrene and will provide monitoring data that can be accessed remotely by telephone. The DOAS system has already been ordered by the Department for other projects and it will be assigned for monitoring Sea Ray's operations at the Cape Canaveral site.

EPA's Comments:

Region IV commended the Department on the thoroughness of the BACT analysis and agreed with the decision to require a pilot-scale program for capturing and treating VOC emissions. EPA also pointed out that the pilot-plant implementation schedules proposed in the BACT determination and in the permit should coincide in regard to the startup of the full-scale control system. As a result of the public's concern about exposure to a hazardous air pollutant as well as the odor of styrene in the interim period prior to startup of the full-scale system, the pilot-scale implementation schedule has been tightened by 14 months from the published intent.

National Park Service's comments:

The only concern mentioned by the NPS was the possibility of styrene emissions impacting the Merritt Island National Wildlife Refuge and the prescribed burns that are periodically conducted.

Final Action:

The final action of the Department will be to issue the permit as discussed above.

136387.1

DETERMINATIONS OF

BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

AND

MAXIMUM ACHIEVABLE CONTROL TECHNOLOGY (MACT)

Sea Ray Boats, Inc.

Merritt Island Facility

Cape Canaveral Plant

Brevard County

DEP File No. 0090093-003-AC
PSD-FL-274

Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation

Month XX, 2000

Sea Ray Boats, Inc.
Cape Canaveral Project
Merritt Island, Brevard County

Sea Ray proposes to construct a new fiberglass boat production plant near its existing Merritt Island Facility in Brevard County. The proposed site is approximately 1 mile East of Sykes Creek and West of the Banana River between the Barge Canal and SR528.

The proposed project will result in a significant emissions increase of volatile organic compounds (VOC) with respect to Table 212.400-2, Florida Administrative Code (F.A.C.). The project is therefore subject to review for the Prevention of Significant Deterioration (PSD) and a determination of Best Available Control Technology (BACT) in accordance with Rule 62-212.400, F.A.C. The project is also subject to a case-by-case Maximum Achievable Control Technology (MACT) Determination in accordance with Rule 62-204.800(10)(d)2, F.A.C. since it will be a major source of hazardous air pollutants (HAP) and the federal MACT standards for the Fiberglass Boat Building industry have not yet been promulgated under the National Emission Standards for Hazardous Air Pollutants (NESHAP).

The details of PSD applicability and a description of the process are presented in the separate Technical Evaluation and Preliminary Determination issued on October 6, 1999.

DATE OF RECEIPT OF APPLICATION:

The original application was received on May 5, 1999. A separate MACT proposal for HAP emissions was received on July 19, 1999. A PSD application and BACT proposal was subsequently received on September 3, 1999.

BACT/MACT DETERMINATION REQUESTED BY THE APPLICANT:

SOURCE	CONTROL TECHNOLOGY	PROPOSED BACT LIMIT
Production Resins	Styrene Content	35 percent (%) styrene
Resin Application	Non-Atomizing Equipment	
Gel Coats	Styrene Content	34 % styrene

The Department and EPA determined that the applicant's proposed Cape Canaveral Plant and the existing Merritt Island Facility are adjacent and comprise a single facility. PSD applies to the proposed project since the VOC emission increases at a major facility will exceed significant levels. This BACT/MACT determination covers the requirements of both the PSD and NESHAP regulations. The applicant requested that the Department's BACT and MACT determinations be the same and as indicated above.

The applicant originally proposed no add-on emission controls, but subsequently agreed to operate the Lamination Building with negative pressure and a single high velocity exhaust stack to dissipate emissions for odor control reasons. Emissions from the Cape Canaveral project are proposed at 211 tons per year of VOC/HAP vented primarily through 1 stack of Building 101 and exhausting 60-75 feet above the ground. Total VOC emissions would exceed 600 tons per year from the existing Merritt Island Facility and the Cape Canaveral Plant combined.

BACT/MACT DETERMINATION PROCEDURE:

In accordance with Chapter 62-212, F.A.C., this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department of Environmental Protection (Department), on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that, in making the BACT determination, the Department shall give consideration to:

- Any Environmental Protection Agency determination of BACT pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 - Standards of Performance for New Stationary Sources or 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants.
- All scientific, engineering, and technical material and other information available to the Department.
- The emission limiting standards or BACT determination of any other state.
- The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine, for the emission unit in question, the most stringent control available for a similar or identical emission unit or emission unit category. If it is shown that this level of control is technically or economically unfeasible for the emission unit in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

There are no promulgated emission limitations contained in 40 CFR Part 60 - Standards of Performance for New Stationary Sources (NSPS) or 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants (NESHAP) that apply to "Contact Open Molding," which is the main process emission generating process involved in fiberglass boat manufacturing.

The U.S. Environmental Protection Agency (EPA) is currently developing MACT standards for processes used in the fiberglass reinforced plastics/composites (FRP/C) and boat manufacturing industries and will propose them this year. Until a NESHAP is proposed, the Department is required by its rules to develop a case-by-case determination of Maximum Achievable Control Technology (MACT) for new major sources of HAP. In this instance, the MACT determination forms the basis for the minimum level of control required by the BACT determination. The MACT determination procedure is outlined below.

The provisions of 40 CFR 63, Subpart B, Requirements for Control Technology Determinations for Major Sources in Accordance with Clean Air Act Sections, Sections 112(g) and 112(j), were adopted as Rule 62-204.800(10)(d)2, F.A.C. Section 112(g) requires the case-by-case MACT determination mentioned above. Following is the definition of case-by-case MACT pursuant to Section 112(g) for new sources of hazardous air pollutants:

Maximum Achievable Control Technology (MACT) emission limitation for new sources means "the emission limitation which is not less stringent than the emission limitation achieved by the best controlled similar source, and which reflects the maximum degree of reduction in emissions that the permitting authority, taking into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy requirements, determines is achievable by the constructed source."

Similar source means "a stationary source or process that has comparable emissions and is structurally similar in design and capacity to a constructed or reconstructed source such that the source could be controlled using the same control technology."

Per Federal Register Volume 61, Number 250, Pages 68394-95, EPA believes that because the Clean Air Act specifically indicates that *existing source* MACT should be determined from *within* the source category (e.g. Fiberglass Boat Manufacturing) and does not make this distinction for *new source* MACT, that Congress intends for transfer technologies to be considered when establishing the minimum criteria for new sources. EPA believes that Congress could have explicitly restricted the minimum level of control for new sources, but did not. The use of the term "best controlled source" rather than "best controlled source within the source category" suggests that the intent is to consider transfer technologies when appropriate.

In addition, the regulations state that in making the MACT Determination, the Department should give consideration to:

(a) Any Environmental Protection Agency proposed relevant emission standard pursuant to section 112(d) or section 112(h) of the Act or an adopted presumptive MACT determination for the source category which includes the constructed or reconstructed major source.

(b) Available information as defined in 40 CFR 63.41. *Available information* means, for purposes of identifying control technology options for the affected source, information contained in the following information sources as of the date of the approval of the MACT determination by the permitting authority:

(1) A relevant proposed regulation, including all supporting information;

(2) Background information documents for a draft or proposed regulation;

(3) Data and information available for the Control Technology Center developed pursuant to Section 113 of the Act;

(4) Data and information contained in the Aerometric Informational Retrieval System including information in the MACT data base;

(5) Any additional information that can be expeditiously provided by the Administrator; and

(6) For the purpose of determinations by the permitting authority, any additional information considered available by the permitting authority.

BACT/MACT DETERMINATIONS BY EPA AND STATES:

The EPA is currently working on a draft proposed MACT for boat manufacturing sources, although the regulations have not been published as of this issuance. However, based upon statements by the EPA, the proposed MACT for new and reconstructed sources is expected to include:

1. The use of production resins that contain a maximum average of 35% total HAP content, based on Manufacturer's Safety Data Sheets (MSDS), with compliance determined on a 3-month rolling average;
2. The use of non-atomizing application equipment for production resins;
3. The use of base gel coats and pigmented gel coats that contain a maximum average of 33% total HAP content, based on MSDS, with compliance determined on a 3-month rolling average;
4. The use of clear gel coats that contain a maximum average of 48% total HAP content, based on MSDS, with compliance determined on a 3-month rolling average;
5. The use of sprayed tooling resins, used for repair of molds, that contain a maximum average of 30% total HAP content, based on MSDS, with compliance determined on a 3-month rolling average;
6. The use of non-atomized tooling resins, used for making and repair of molds, that contain a maximum average of 39% total HAP content based on MSDS, with compliance determined on a 3-month rolling average;
7. The use of tooling gel coats, used for making and repair of molds, that contain a maximum average of 40% total HAP content, based on MSDS, with compliance determined on a 3-month rolling average;
8. No control of hazardous air pollutants emitted from mold sealing, releasing, stripping, and repair materials;
9. No control of hazardous air pollutants emitted from wood coating ;
10. The use of resin and gel coat cleaning solvents that contain no HAP;
11. The use of carpet and fabric adhesives that contain no HAP;
12. The use of the highest styrene content in calculations when MSDS ranges are used.

Consideration has been given by EPA to use of add-on control equipment. It is not certain whether such equipment will be required at new sources by the time EPA issues new source MACT requirements for the industry pursuant to Section 112(d). This uncertainty does not affect consideration of add-on control equipment under Section 112(g) case-by-case MACT determinations or case-by-case BACT determinations.

The following table provides information on recent emission limitations by EPA and the States for projects involving gel coat and resin application in a lamination process.

PROJECT LOCATION	INSTALLATION DATE	TECHNOLOGY	FLOWRATE (ACFM)	COMMENTS
Bombardier, IL	1996	Thermal Oxidizer	~40,000	Makes up to 20 ft. sport boats using enclosed automated assembly line
Metro Machine, VA	1999	Thermal Oxidizer	60,000	Uses modular enclosure for painting hulls of large ships
Corsair Marine	?	Vacuum bagging		Makes Trimarans
Cor Tec, OH	1992	Catalytic	5,000	
Tomkins-Lasko, TX	1985	Thermal Oxidizer	18,000	
Tomkins-Lasko, PA	1985	Thermal Oxidizer	24,000	
Tomkins Lasko, VA	1986	Thermal Oxidizer	18,000	
A.R.E., OH	1995	Thermal Oxidizer	100,000	
Crane Kemlite	1990	Thermal Oxidizer	26,000	
Enduro	1991	Thermal Oxidizer	15,000	

OTHER INFORMATION AVAILABLE TO THE DEPARTMENT:

In addition to the information submitted by the applicant and that mentioned above, other information available to the Department includes the references at the end of this review and the following:

- Assessment of Styrene Emissions Controls for FRP/C and Boat Building Industries
- EPA communication approving an alternative shipbuilding MACT for Metro Machine Corporation's Norfolk, VA facility using an enclosure and RTO
- EPA Unified Air Toxics Web site including information on the Boat Manufacturing MACT
- Web Site for Anguil Environmental Systems, Inc.: http://www.anguil.com
- Web Site for Bombardier Motor Corporation of America: http://www.bombardier.com
- Web Site for National Marine Manufacturers Association: http://www.nmma.org
- Web Site for Sea Ray Boats, Inc.: http://www.searay.com
- Web Site for Big Top Manufacturing, Inc.: http://www.bigtopshelters.com
- Memorandum to the EPA from the Eastern Research Group, Inc. dated July 7, 1999.
- Informational Paper entitled, "Fiberglass Reinforced Plastics: Indiana's Section 112(g) Experience" by the Indiana Department of Environmental Management
- Bombardier permit file obtained from the Illinois Environmental Protection Agency
- Personal communications with control equipment manufacturers
- Personal communications with state environmental agencies

VOC/HAP CONTROL/PREVENTION BACT OPTIONS

Most VOC emissions are generated in the application, holding, and curing of the gel coat and subsequent laminates. These emissions consist primarily of styrene monomer that is evolved prior to completion of polymerization. In combustion processes the key is to prevent VOC formation. In this process, the VOC is a process raw material and the key is to prevent its evolution. Thereafter possibilities exist to contain it, possibly concentrate it and destroy or consume it.

The applicant and the Department were able to identify several potential methods available to prevent and/or control VOC and styrene emissions from this production facility. These include a variety of add-on control equipment, materials substitution, process modifications, solvent replacement, and transfer efficiency improvements. A brief description is presented below.

Local Airflow Control: This involves moving air pollutants directly from the emission source to minimize the amount of air to be ventilated. In a large open space, this can be achieved by supplying fresh air toward the emission source and capturing the emissions with a mobile exhaust hood and flexible duct in the vicinity of the source. Such push-pull systems have been installed in other industries to provide effective capture and treatment. The capture efficiency is generally better for a push-pull system than for an exhaust hood by itself. The applicant's airflow arrangement amounts to a large push-pull system for the entire building rather than an optimized design for the collection of pollutants.

Several companies in Europe have installed "displacement ventilation" systems to reduce worker exposure to contaminants, as well as the volume of air to be handled. Displacement ventilation relies on the concept that there is a temperature gradient between air near the ceiling and air near the floor, at a typical industrial facility. Cool, "fresh" air is supplied, at a low velocity, to the work zone. If the source of the work zone emissions is at a higher temperature than the supply air, the supply air is heated and picks up contaminants as it rises out of the work zone. Because the proposed project involves handling and moving very large parts, displacement ventilation may or may not be feasible for this project.

Enclosures: An enclosure is simply a means of physically confining the emissions at the source to prevent dispersion into the surrounding air. Enclosures might include covers on resin mixing tanks, enclosed resin baths, and spray booths for the lamination process. Captured emissions would be contained in lower volumes at higher concentrations making it easier to control. Enclosures could also be fashioned with curtains or portable walls. A high-velocity air curtain down draft system may also be technically feasible.

The airflow rate and VOC concentration play an extremely important part in determining costs. To develop an accurate assessment of the related control costs, it is first necessary to investigate minimizing the flow rates to be treated and concentrating the VOC captured prior to treatment, or capturing emissions at the source. A complete assessment of the possible capture and control systems, integrated with the ventilation design, is what is needed.

Materials Substitution: The emissions of VOC and HAP result from the evaporation of these pollutants during the use of raw materials in the fabrication process. Substituting low or non-VOC/HAP raw materials in place of solvent containing raw materials can significantly reduce emissions. For example, the majority of styrene emissions come from the application of the resins and gel coats during the lamination process. It may be feasible to substitute low styrene resins and

gel coats to minimize the available styrene that could be emitted. However, because much of the styrene polymerizes to form the fiberglass part, this method has a practical limit. Another example would be replacing solvent-containing coatings with water-based coatings. This not only eliminates the VOC/HAP from the application of the paint, but also the need for solvent-based thinners and cleaning agents. Other processes that may benefit from material substitution would include interior wood surface coating, exterior wood surface coating, carpet and upholstery adhesives, and hull bottom surface coating. Raw material substitutions for the fiberglass boat fabrication industry have been identified as commercially available and result in quantifiable reductions. This strategy should be included as part of the final control technology determination. The applicant has proposed the use of low styrene resins and gel coats as MACT.

Process Modifications: Some plants that fabricate the same small model of fiberglass boat are able to make process modifications to reduce emissions. It may be possible for such a plant to adopt the fabrication process to include closed molds, which emit much less VOC/HAP than the open molding process. Closed molding has been successfully used for small assemblies and parts. Another example of process modification would be vacuum bagging an open mold process to reduce emissions. Vacuum bagging has been successful for the narrow, long hulls on catamarans and trimarans. However, the applicant indicated that closed molding and vacuum bagging is not feasible for this specific plant. The Department does not have enough information to confirm or deny the applicant's assertion that open molding in a very large unrestricted space is the only workable method of fabricating its product.

Solvent Replacement: Existing fiberglass boat fabrication plants use a wide variety of cleaning and thinning solvents, many containing numerous VOC/HAP. Replacement of many of these solvents with low or zero VOC/HAP is possible without affecting product quality. For example, it may be possible to replace a solvent-cleaning agent with a non-VOC/HAP cleaning agent for the majority of hand-wipe cleaning operations. Replacing organic solvents with low- or non-VOC/HAP solvents have been identified as commercially available for the fiberglass boat fabrication industry. This alternative, particularly for cleaning agents, will result in measurable emission reductions and should be included as part of the final control technology determination.

Transfer Efficiency Improvements: Conventional spray applicators will atomize gel coats and resins and greatly increase VOC/HAP emissions. To decrease emissions and reduce raw material costs, most plants switched to high volume, low-pressure applicators that would increase the transfer efficiency. Current technology for this industry includes the use of non-atomizing applicators and flow coaters to further reduce VOC/HAP emissions. This technology is commercially available and demonstrated. Therefore, it should be included as part of the final control technology determination. The applicant proposed non-atomized applicators as MACT.

Add-On Control Equipment: A review of the EPA RACT/BACT/LAER Clearinghouse database shows that add-on controls have not generally been applied to fiberglass boat fabrication plants except for the Bombardier facility in Illinois. This is most likely due to the approach to ventilation used and the high capital and operating costs associated with the capture and control of a large exhaust stream containing a relatively low VOC concentration. Yet, a wide variety of add-on control equipment may be applicable to such a plant, including thermal oxidation, catalytic oxidation, carbon adsorption, biofiltration, bio/chemical scrubbers, and condensation. Recent efforts by several manufacturers have focused on concentrating the VOC prior to destruction with a conventional technology. The following section describes available control options.

Thermal Oxidation (Incineration)

The gas stream is exposed to high temperatures (approximately 1480°F for styrene) to oxidize the VOC to carbon dioxide and water. An auxiliary fuel is used to initially reach and then maintain the high operating temperatures required. A recuperative thermal incineration system includes a heat exchanger to preheat the inlet gas stream prior to incineration. A regenerative thermal incinerator typically uses ceramic materials to store a large thermal mass generated by the thermal incinerator and then use the fuel value of the inlet gas stream to maintain the incineration process. Both of these methods attempt to reduce the operating costs incurred from firing an auxiliary fuel. Thermal incineration is technically feasible and commercially available. However, because this project requires the treatment of a large volume of dilute gas, a standard thermal incinerator would probably be cost prohibitive. However, combined with a preconcentrator system (described below) or a ventilation system with a reduced airflow, this technology could be cost effective.

A preconcentrator removes the organic compounds from the dilute gas stream and then releases it back to a smaller, purging gas stream with a much higher concentration. The smaller flow rate and higher concentration of the new gas stream is much easier and cost effective to control with conventional technology. For example, the dilute gas stream could be passed over a bed of activated carbon to remove organics. When the carbon bed approaches saturation, a diverter valve switches the exhaust stream to a second carbon bed. A small volume of hot air or steam is then passed across the saturated carbon bed to release the organics, which are destroyed by a catalytic or thermal oxidizer. A new technology involves a "rotor concentrator" that consists of a large, slowly rotating concentrator wheel coated with activated carbon or zeolites. The carbon or zeolites adsorb the organics as they pass through the wheel. A small sector of the wheel is partitioned off from the inlet gas stream and hot air is passed through this portion to desorb the organics for destruction in a small thermal incinerator. A rotor concentrator is capable of reducing the treatable gas stream to 10% of the original stream and concentrating the organic compounds by a factor of ten. Although a rotor concentrator has a relatively high capital cost, operating costs are greatly reduced due to the smaller, more concentrated gas stream requiring treatment.

Catalytic Oxidation (Incineration)

This technology passes the captured gas stream over a catalyst bed at a moderate temperature (approximately 450°F for styrene), oxidizing the organic compounds to carbon dioxide and water. An auxiliary fuel is required to elevate the gas stream to the required temperature range. Ideally, once this temperature is reached and the incineration process begins, there would be enough fuel value in the inlet gas stream so that only minor amounts of auxiliary fuel would be required to maintain the operating temperature. A heat exchanger may be added to preheat the inlet gas stream prior to incineration (recuperative incineration). Likewise, ceramic materials may be included in the design to store a large thermal mass generated by the incinerator in order to make use of the fuel value of the inlet gas stream to maintain the incineration process (regenerative incineration). Both of these methods attempt to reduce the operating costs incurred by the combustion of an auxiliary fuel. The applicant commented that it is possible for styrene to polymerize on the precious metal catalyst bed and gradually decrease the effectiveness. However, case studies seem to indicate that the loss in effectiveness may be due the VOC concentration of the inlet gas stream and the life of the catalyst, as much as polymerization. There does not appear to be enough information to reject this technology solely based on poisoning due to polymerization.

Activated Carbon Adsorption
The captured gas stream is passed across a bed of activated carbon to adsorb the volatile organic compounds. Activated carbon is generally used because its internal pore structure provides a very large surface area on which to adsorb the volatile organic compounds. Once the carbon bed becomes saturated with organic compounds, hot air or steam is used to release the VOC for recovery or destruction and regenerate the bed for another cycle. For these systems, when one carbon bed is in operation, another carbon bed is being regenerated. Destruction may include a small catalytic or thermal incinerator and recovery could include refrigeration. In this manner, the carbon bed acts as a preconcentrator. The applicant commented that it is possible for styrene to polymerize on the activated carbon and decrease the effectiveness. However, the carbon bed only remains "active" for a defined period and must eventually be replaced. It is uncertain whether polymerization would significantly reduce the life of the activated carbon.

Biofiltration
This relatively new technology has been used in Europe to control odors from organic compounds. The VOC-laden gas stream is collected and passed under an active bed of soil containing microorganisms. As the air rises through the soil, the microorganisms consume the chemicals and convert them to carbon dioxide and water. Although there are a few applications of biofiltration for odor control in the United States, the effect of styrene on such a system is unknown as well as the level of control. Therefore, this technology is not yet considered to be commercially available or demonstrated as technologically feasible for this project.

Bio/Chemical Scrubber
Chemical scrubbers are absorption systems designed to dissolve a specific pollutant in a solvent, usually water, but based on the chemistry of the exhaust stream. Exhaust streams that include a variety of chemicals may also require a variety of solvents, adding complexity to the control system and potential disposal costs if recovery is not practical. Although the primary pollutant from the fabrication of fiberglass boats is styrene, there are significant amounts of many other volatile organic compounds. Typically, a VOC concentration above 200 ppm is necessary to make chemical scrubbing practical. Conventional chemical scrubbers have been tested on a pilot scale, but do not appear to be a viable control technology for this industry at this time. However, a new technology that shows great promise for removing VOC/HAP emissions from building ventilation systems is the injection of finely atomized bioenzyme spray into the air inlet ducts allowing catalytic degradation of organic compounds to occur prior to their exhaust from the building. A scrubber can be added at the outlet to insure maximum destruction of air pollutants.

Condensation
A condensation system includes refrigeration units to cool the exhaust stream and condense out the chemical contaminants. The condensate is collected and perhaps separated for reuse or disposed of as a waste. For highly concentrated gas streams, these systems can be more than 95% efficient. However, the gas stream from this plant would be very dilute and the condensate would have little or no value for reuse. Therefore, a condensation system is not considered a viable option for this project. However, combined with a preconcentrator system (described below), this technology could be considered technically feasible.

Emerging Technologies: The Department also identified the following emerging add-on control technologies that are in various stages of development: membrane technology, biofilter systems, ultraviolet/oxidation technology, and photocatalytic oxidation.

FEASIBILITY AND COST OF ADD-ON CONTROLS

The applicant asserts that add-on control technologies are not feasible due to the prohibitive cost of treating a very large volume of exhaust air with low VOC concentrations. The applicant's position is based on the presumption that making changes to the air handling system so that less air is introduced into the building (making the exhaust treatable while not exceeding OSHA exposure limits) is not possible where large boats are being manufactured. However, in other industries such as automobile manufacturing, ways have been found to reduce air volumes substantially by rethinking the approach to ventilation and optimization of current designs. In that industry, exhaust volumes similar to the applicant's proposed 290,000 cfm have been reduced to as low as 80,000 acfm or less through optimization of existing designs using computerized models for calculating contaminant concentration with greater precision.

In every case, ventilation design procedures require reconciliation of the geometry of the system with the volumetric flow rates required to capture air contaminants and evacuate them properly. The extent to which a building is evacuated depends on the factor of safety that the designer selects relative to the permissible exposure level (PEL). In the applicant's case, a safety factor of 4.2 has been selected (12 ppm styrene vs. the OSHA limit of 50 ppm). Therefore, the issue that must be addressed here is whether or not the applicant's safety factor is really justifiable for employee safety or for other considerations such as insurance costs, legal liability concerns, or perhaps for other reasons. Industrial ventilation literature contains several references that deal with this issue, one of which appears in the Handbook of Ventilation for Contaminant Control by Henry J. Dermott, Second Edition, 1985, p. 283:

> "The adequacy of a ventilation system is determined by evaluating employee exposures with the system in operation. If the exposures are within acceptable limits compared to OSHA permissible exposure standards, Threshold Limit Values (TLVs) or other toxicological guidelines, *the system is providing sufficient protection to the workers.*" (emphasis added)

The above excerpt affirms that no particular safety factor is really required in ventilation design. Due to the variable nature of pollutant concentrations for a process such as fiberglass boat building, it appears that some safety factor is a prudent practice but perhaps not the four-fold factor that the applicant proposes here. There may exist a less conservative safety factor that would allow for feasible add-on controls while adequately providing for worker safety. The need for very close examination of the feasibility of add-on controls for Sea Ray's proposed Cape Canaveral Complex is clear in view of styrene's classification as a hazardous air pollutant and the fact that proposed emission levels would bring Sea Ray's total VOC emissions to well over 600 tons per year emitted in an area with a radius of only a couple of miles.

According to the "Toxicological Profile for Styrene" published by the U.S. Public Health Service (1992), adverse health effects of short-term styrene exposure include nervous system effects such as nausea, muscle weakness, tiredness, and depression, while the ill effects of long-term exposure in the workplace remain unknown. The International Agency for Research on Cancer has determined that styrene is possibly a carcinogen.

Although a lot of work in ventilation research appears in the professional literature for other manufacturing processes, not as much effort has been undertaken to optimize air handling and

ventilation design in the fiberglass boat building industry. There has been little impetus for boat builders to research this on their own in the absence of a regulatory requirement for add-on controls. Consequently, rethinking the approach to ventilation design for boat building will require some effort as it has in the automobile and other industries. Yet, the need for further research and development in the area of ventilation should not forestall efforts by regulatory agencies to do something about the styrene pollution problem within the confines of existing regulations.

The Bombardier boat building facility in Benton, Illinois installed a thermal incineration control system in 1996. This facility avoided PSD review by installing control equipment that was sufficient to mitigate PSD threshold emission increases. According to information in the Illinois Environmental Protection Agency's (IEPA) permitting file, Bombardier acquired the Benton facility from Celebrity Boats several years ago. Bombardier continued to manufacture Celebrity's line of 18 to 31-foot pleasure boats while adding an automated production system for its new line of smaller sport boats called "jet boats" that are made in 14.5 and 18 foot lengths. The Automated Assembly Line (AAL) had an initial total capacity of 10 boats per hour for these two sizes - - 6 for the smaller size and 4 for the larger boats. Total raw materials used including gel coat, resin and catalyst were approximately 6,350 lbs/hr with about 83 percent of the total or 5,310 lbs/hr consisting of resin and about 14 percent or 915 lbs/hr of gel coat.

Emissions increases from the AAL for its sport boats caused Bombardier to install a 95 percent efficient (design) Regenerative Thermal Oxidizer (RTO) using natural gas as fuel. According to the Illinois Administrative Code (35 IAC 215.301), VOC emissions must be less than 8 lbs/hr per "source" which has been interpreted to mean "per spray gun." Since "per-gun" emissions were determined to be 11 lbs/hr, 35 IAC 215.302 applies requiring 85% VOC control. This required a system with a capture efficiency of 90% and a destruction efficiency of 95% (0.9 x 0.95 = 0.855). Regenerative Thermal Oxidation was selected over Catalytic Oxidation due to the low VOC concentrations involved.

When initially permitted in 1995, styrene emissions from the AAL totaled about 156 lbs/hr - - 106 from resin and 50 from gel coat. Other VOC emissions brought the total uncontrolled VOC emissions vented to the incinerator to 179 lbs/hr. Following thermal destruction, about 120 TPY are emitted from the AAL to the atmosphere. Another 105 TPY of VOC were emitted from the facility's non-AAL sources. The following assumptions were made in arriving at these emissions estimates:

Content of styrene in gel coat and resin	35%
Percent of styrene emitted from gel coat	30%
Percent of styrene emitted from resin	11%
"Other" VOC content of gel coat	5%
No. of applicator guns/lbs. per gun	22/8.2
Design Capture/Destruction Efficiency	90%/95%*
Minimum Thermal Destruction	85%

At present, Bombardier still operates under its construction permit, which has been revised several times since its issuance on December 21, 1995. Revisions have included increasing the styrene content from 35 to 42% and an associated reduction in the total material usage from 14,382 to 9,011 TPY. Most recently the permit was modified to include an annual cap on VOC (VOM)

emissions from the AAL of 120 TPY and an annual cap on plant-wide emissions of 225 TPY (to clarify the AAL's status as a "non-major" source or modification).

The controversy about applying Bombardier's control technology elsewhere in the boat industry was discussed at the June 8, 1999 Boat Manufacturing NESHAP meeting between the EPA and the National Marine Manufacturers Association (NMMA) dealing with MACT floors for boat manufacturing operations. An excerpt from the written summary of that meeting follows. (The summary was prepared by staff of the Eastern Research Group, Inc.):

> *"The boat manufacturers stated that they are concerned that the Bombardier facility, which has a thermal oxidizer on the jet boat line, could be new source MACT for production resin operations. The industry does not believe this facility is representative of the industry. They stated that Bombardier has the only capture and control system in the industry and was set up specifically for controlling emissions from small, jet boat production. They added that boat manufacturers often change the sizes and type of boats they produce and this capture and control system is not flexible to allow larger boats in the capture enclosure. Industry representatives also mentioned that a control system similar to Bombardier's is not cost feasible for most of the boat manufacturers. ... The EPA responded that they currently have concluded, based on available data, that Bombardier is not the best-controlled source in the industry and their emissions are probably no better than a facility using 35-percent styrene resin and non-atomized application. Therefore, the Bombardier facility will not affect the new source floor. In addition, EPA has made the determination that new source MACT and existing source MACT are both 35- percent styrene resin and non-atomized resin application.*
>
> *The boat manufacturers stated that they are still concerned about the physical performance of 35-percent styrene resins. They noted that many boat manufacturers guarantee their boats for 5 or 10 years and that earlier low-styrene resins led to hull cracking and expensive warranty repairs. ...*
>
> *The EPA responded that they will...consider the same limits for new and existing sources for all of the open molding resin and gel coat operations."*

At this time, the Department questions the accuracy of the statement that Bombardier's emissions are no better than a facility using 35% styrene resin and non-atomized application. A review of Bombardier's permit file reveals that the facility uses spray lay-up for resin and gel coat and that the originally permitted 35% styrene resin was increased to 42% while the originally permitted material usage has been reduced from 14,382 to 9,011 TPY. Total VOC emissions from Bombardier's AAL after control are limited to 120 TPY. Using spray lay-up and 35% non-vapor suppressed resin results in an EPA MACT Model Point Value of 160 (points equal pounds of HAP per ton of resin or gel coat).

For non-atomized application of 35% non-vapor suppressed resin, the EPA MACT Model Point Value is 85. Bombardier's calculated *uncontrolled* styrene emissions from the originally permitted 35% resin is 77.2 pounds per ton of resin. However, after 90% capture and 95% destruction, this value drops off the EPA's Point Value chart to 11.2. If the current 42% resin is compared at the lower material usage rate, a similar result is obtained. Therefore, unless shown otherwise, the Department cannot agree that Bombardier is not the best-controlled MACT or BACT boat building source. At the very least, the Department can consider Bombardier as a similar source

within the MACT definition for 112(g) determinations. At this time it appears that a section 112(d) MACT will rely almost exclusively on 'pollution prevention' to protect the environment. As a result, in this case, BACT will be the 'pace-setter' regulation for new major sources since it is always a case-by-case determination.

The ventilation system for Bombardier's AAL uses two 3.5 MMBtu/hr air makeup units each providing about 40,000 cfm of conditioned (heated) air to the manufacturing areas from above the production lines. The production lines are housed in a building that is roughly 530 feet by 230 feet at its widest point. The width narrows to about 110 feet at one end so the total area is probably around 100,000 square feet. Each of the lines is conveyorized and has its own air management system, which is tied into the general ventilation system for the RTO. There are a total of 11 spray application booths. Enclosures are utilized to contain emissions within each respective area so that they are captured and vented to the RTO without being released into the general air space of the plant.

In contrast, Sea Ray's facility, as proposed, would emit 211 TPY of VOC in total (consisting of 125 TPY of styrene) from two (or possibly three) buildings - the Lamination/Assembly Building(s) (No. 101) and the Fabrication Building (No. 102). Most of the VOC emissions would be emitted from the Lamination/Assembly Building which, covers 72,000 square feet (21,000 for gel coat/lamination, 36,000 for assembly and 15,000 for parts processing and inspection). The total area of Sea Ray's Fabrication Building would be 43,000 square feet, about half of which would be used for fabrication and the other half for woodworking, warehousing, and related activities. The heights of Sea Ray's Lamination/Assembly Building and Bombardier's building are believed to be roughly equivalent.

The ventilation system that Sea Ray proposes would supply fresh makeup air from fans mounted on the ceiling above the lamination area blowing down across the open molds. Along the outside walls would be intake ducts to exhaust the VOC-laden air to the ventilation fans on the roof of the building. Sea Ray claims that the ventilation design should achieve a level of 12 ppm as the average indoor air concentration of styrene to provide a safe margin for workers, as well as Sea Ray's health and liability insurance premiums. Sea Ray proposes to evacuate around 335,000 cfm from the 72,000 square foot Lamination/Assembly Building which results in an overall ventilation ratio of 4.7 cfm per square foot of plant area compared to Bombardier's ventilation ratio for the AAL of 0.8. Thus, Sea Ray proposes to ventilate at an overall flow rate per square foot that is almost six times that of Bombardier's facility. Sea Ray's ventilation ratio for the lamination area itself is about 12.1 cfm per square foot based on exhausting 290,000 cfm from a 24,000 square foot "enclosed" room. Although designed to be enclosed, doors are typically left open at the existing Merritt Island plant for employee comfort and movement of materials.

Although there are commonalties with Bombardier's process in the way emissions are generated, Sea Ray's process is not an automated conveyor-type operation and it produces larger boats (58, 63, and 65 feet long). Total allowable VOC emissions from the two companies are comparable, however. Sea Ray's lamination area is a 24,000 square foot room with a height of 50 feet, which must remain open at the top for operation of a bridge crane system whereas Bombardier's conveyor-type operation is compartmentalized.

Sea Ray's current ventilation practice at the Merritt Island Plant of keeping the doors open for employee comfort and movement of materials defeats the purpose of a conventional ventilation

system for contaminant control. Thus, it appears that a different type of ventilation system is needed - one that balances the need for worker protection with the protection of the facility's neighbors. A duct system with its intake mounted below a floor grate network would take advantage of styrene's 3.6 to 1 density ratio relative to air and perhaps offset the "open door" factor while allowing concentrations high enough for treatment with add-on controls.

The main questions that arise about ventilation are: Is it necessary for Sea Ray to ventilate at such a high rate? If not, what is the minimum practical rate at which the building must be ventilated to meet OSHA standards while at the same time allowing cost effective emission control and how can that be effected? It seems that these questions can be answered only by investigating ventilation rates and flow patterns under actual operating conditions such as afforded by a pilot-scale demonstration project.

Ventilation options that might be investigated in a pilot project include lowering the maximum volume of exhaust air, varying the air flow according to the measured concentrations in specific processing zones, exhausting only the more concentrated air using mobile hoods and ducts, or using floor level exhaust intakes to prevent updraft dilution. A variable zone airflow system would provide needed operational flexibility since there is no way designers can know for sure what the concentrations will be at any given point in the system.

Enclosure options that can be evaluated include fixed and movable designs. Metro Machine Corporation of Norfolk, Virginia provides an example of how capture problems have been solved for coating operations involving large vessels. Metro has developed a movable modular enclosure system used with a Regenerative Thermal Oxidizer (RTO) to capture and treat VOCs emitted from coating operations at the Norfolk shipyard. Metro's CAPE (Compliant All Position Enclosure) system is designed to exhaust 60,000 cfm to a fabric filter while recycling 10,000 of the 60,000 cfm to the RTO. This system has been approved by the EPA as an alternative to the shipbuilding MACT. As previously mentioned, the similar source definition for case-by-case MACT under Section 112(g) as well as the BACT procedures certainly allow for consideration of technologies and approaches in-use outside the narrow category of the fiberglass boat industry.

The Department's research indicates that relatively inexpensive movable spray booth enclosures are presently available for large boats. Big Top Manufacturing of Perry, Florida, manufactures movable enclosures for spray painting of boats up to 125 feet. An enclosure for attachment to an exhaust duct can be made for repositioning with an overhead crane or mounted on wheels. An aluminum framed enclosure measuring 36 feet wide, 100 feet long and 25 feet high and mounted on wheels costs less than $40,000.

Sea Ray evaluated the cost effectiveness of two control options for exhausting and treating VOC emissions from the boat hull lamination process. The first involves two spray booth designs - - one for length-wise ventilation at 40,000 cfm and the other for cross-flow ventilation of the spray booth at 100,000 cfm. These are based on the American Conference of Governmental Industrial Hygienists' (ACGIH) recommended ventilation rate of 50 cfm per square foot of cross sectional area and areas of 800 and 2,000 square feet for the length-wise and cross-flow options, respectively. The second control option evaluated by Sea Ray involves exhausting the entire lamination building with a flow of about 370,000 cfm. Sea Ray based this on treating the entire lamination working area as a spray booth using the 50 cfm/ft^2 spray booth ventilation factor (250 ft long x 30 ft high x 50 cfm/ft^2).

Sea Ray estimated the total annual VOC (styrene) emissions for the 40,000 and 100,000 cfm cases using an emission factor of 48 percent of the styrene in the gel coat and skin coats and 11 percent emitted from the total styrene content in the resin. These factors were multiplied by the material usage rates for one hull and then projected to an annual emission basis using a total of 5,000 hours of production time per year. Based on Sea Ray's estimate of 62.75 hours per boat hull and 5,000 hours of production per year, approximately 80 hulls per year would be produced (assuming hulls of the same size). This would roughly equate to one hull manufactured every 2.6 days (based on 208 days per year of lamination production time). However, Sea Ray stated on page 2-4 of the application that one hull takes about 6 working days to construct.

Nonetheless, Sea Ray projected its total VOC emissions for the two spray booth cases at only 12.4 TPY based on 80 hulls per year being produced at an emission rate of 312.3 lb. per hull. This assumes that the majority of emissions occur from processing steps other than applying gel coat and resin to the hulls, which is not the case. Yet, for the option of ventilating the entire building, Sea Ray used the total VOC removal of 167 tons for its cost effectiveness calculation. If the same tonnage removed is applied to all three cases, the cost effectiveness of the 40,000 cfm option (as calculated by Sea Ray) becomes $2,383/ton vs. $33,610/ton and the 100,000 cfm option becomes $4,315/ton vs. $60,847. Consequently, Sea Ray's cost effectiveness analysis is interpreted to reflect the control costs being applied to the entire 167 tons removed in each case. This means that both spray booth options as calculated by Sea Ray are cost-effective, assuming all lamination is performed in one spray booth.

The Department's cost effectiveness calculations are based on quotes received from MEGTEC Systems of De Pere, Wisconsin. MEGTEC has installed over 4,000 VOC control systems throughout the world since 1970 covering a variety of industries. A 100,000 cfm Regenerative Thermal Oxidizer unit will cost about $13 per treated cfm for the basic equipment. Installation adds another 40 percent resulting in an installed equipment cost of approximately $1,800,000 for the 100,000 cfm option. Indirect costs add another 35 percent yielding a total capital cost of about $2,448,000 ($269,000 annualized over 15 years). Operating costs bring the total annualized RTO system cost to about $514,000 for a cost effectiveness of $514,000/167 = $3,078/ton VOC removed. Adding Sea Ray's cost estimate for the spray booth ($116,864) results in a worst-case total cost effectiveness of (514,000 + 116,864)/167 = $3,777/ton for the 100,000 cfm option. Given styrene's status as a hazardous air pollutants, this cost per ton is within the Department's guidelines for cost-effective add-on controls.

MACT DETERMINATION:

Background information documents posted on the United Air Toxics Website include Draft Data Summary Tables. The Production Resin Draft Summary Table lists Bombardier Motor Corp. of America as the best controlled fiberglass boat manufacturing facility. Bombardier uses a thermal oxidizer to control emissions from atomized spray application of resin. The table notes that Bombardier uses a resin with a weighted average of 42.0 % HAP in "neat resin plus," and notes that for the thermal oxidizer, 100% capture and 95% control are assumed. "Neat resin plus" is defined as the neat resin plus and HAP that is added to the resin at the facility (fillers not included).

Sea Ray Boats, Inc. does not believe that they are similar to Bombardier because Bombardier uses their thermal oxidizer to control VOC emissions from their personal water craft manufacturing

line. Sea Ray Boats, Inc. believes that it is not cost effective to use a thermal oxidizer to control VOC emissions from the manufacturing of large yachts. The Production Resin Draft Summary Table lists Corsair Marine as the second best controlled fiberglass boat manufacturing facility. Corsair Marine located in Chula Vista, California, uses low styrene content materials and vacuum bagging to manufacture trimarans, 3-part catamarans. Vacuum bagging reduces HAP emissions by 45 percent. Sea Ray Boats, Inc., states that vacuum bagging is not compatible with their manufacturing process.

The Department requested a determination from USEPA Region 4 as to whether or not 40 CFR 63 Subpart II – NESHAPs for Shipbuilding and Ship Repair (Surface Coating) applies to facilities that coat pleasure vessels that are 20 meters or greater in length. Regardless of this determination, the HAP limits for ship marine coatings as listed in Subpart II can be reasonably applied to boat marine coatings on the basis of the similar source definition applicable to 112(g) case-by-case MACT determinations. Marine coatings for ships have emissions comparable to emissions from marine coatings for boats. Ships and boats are structurally similar in design and capacity such that the source could be controlled using the same control technology, i.e., low-HAP marine coatings. The Antifoulant Coatings Draft Summary Table found on the United Air Toxics Website, indicates that the ship antifoulant coating HAP limits contained in Subpart II can be met by boat manufacturers as well. In terms of "similar sources," it is also reasonable to expect coatings and adhesives, used for custom wood furniture and cabinetry installed inside yachts, to be able to comply with the wood furniture coating limitations found in 40 CFR 63 Subpart JJ NESHAPs for Wood Furniture Manufacturing Operations.

After reviewing the applicant's proposed MACT, information from EPA, information concerning facilities permitted in other states, and existing NESHAP standards, the Department has made the determination that Maximum Achievable Control Technology (MACT) for this facility shall be:

1. the use of production resins that contain a maximum average of 35% total HAP content, based on Manufacturer's Safety Data (MSD) Sheets, with compliance determined on a 3-month rolling average;
2. the use of non-atomizing application equipment for production resins; Sea Ray shall submit an operation and maintenance plan and operator training plan including but not limited to equipment calibration methods to achieve maximum HAP reduction;
3. the use of base gel coats and pigmented gel coats that contain a maximum average of 33% total HAP content, based on Manufacturer's Safety Data (MSD) Sheets, with compliance determined on a 3-month rolling average;
4. the use of clear gel coats that contain a maximum average of 48% total HAP content, based on Manufacturer's Safety Data (MSD) Sheets, with compliance determined on a 3-month rolling average;
5. the use of sprayed tooling resins, used for making and repairing molds, that contain a maximum average of 30% total HAP content, based on Manufacturer's Safety Data (MSD) Sheets, with compliance determined on a 3-month rolling average;
6. the use of non-atomized tooling resins, used for making and repair of molds, that contain a maximum average of 39% total HAP content, based on Manufacturer's Safety Data (MSD) Sheets, with compliance determined on a 3-month rolling average;

7. the use of tooling gel coats, used for making and repair of molds, that contain a maximum average of 40% total HAP content, based on Manufacturer's Safety Data (MSD) Sheets, with compliance determined on a 3-month rolling average;
8. no control of hazardous air pollutants emitted from mold sealing, releasing, stripping, and repair materials;
9. no control of hazardous air pollutants emitted from coating processes for exterior wood parts.
10. compliance with 40 CFR 63 Subpart JJ, NESHAPs for Wood Furniture Manufacturing Operations, for carpentry adhesives and non-structural interior wood parts (e.g., cabinets, furniture and trim);
11. the use of bottom coatings and any other exterior coatings (except for wood parts) that are compliant with 40 CFR 63 Subpart II - NESHAPs for Shipbuilding and Ship Repair (Surface Coating);
12. the use of resin and gel coat cleaning solvents that contain no HAPs. An exception is the use of solvent cleaning machines which comply with the requirements of 40 CFR 63 Subpart T-Halogenated Solvent Cleaning;
13. the use of carpet and fabric adhesives that contain no HAPs. An exception is the use of aerosol adhesives;
14. the use of the highest styrene content in calculations when Manufacturer's Safety Data (MSD) Sheets with styrene content ranges are used.

Recordkeeping and Reporting Requirements:

1. Sea Ray Boats, Inc., shall compile records on a monthly basis and maintain those records for a minimum of 5 years. At a minimum, these records shall include:
   a. the identification of all coatings used (resins, gel coats, marine coatings, adhesives, etc.),
   b. certification of the as-supplied HAP/VOC content of each batch of coating,
   c. the volume of each coating applied,
   d. amount of thinner used, and
   e. determination of compliance with the appropriate HAP limit.
2. Within 60 days following the end of each 6-month period after startup, Sea Ray Boats, Inc., shall submit a semi-annual compliance report.

PROVISION FOR FUTURE EPA SECTION 112(D) MACT DETERMINATION

At such time as the U.S. EPA promulgates final regulations in 40CFR63 establishing standards for the Boat Manufacturing Industry, and the Department adopts such standards into its rules, the permittee may provide reasonable assurances of its ability to comply with the "new source" standards and may then, for purposes of MACT compliance, comply with any less restrictive specific provision of the promulgated MACT for "new" sources rather than the more restrictive specific provisions of the case-by-case MACT.

BACT DETERMINATION:

In reaching a decision on the BACT determination, the above facts led to two questions that had to be resolved. The first was whether the control technology demonstrated in these other facilities is available for full-scale adaptation in Sea Ray's lamination operation. The second question concerned whether adaptation and operating costs that may approach the 'upper range' of cost effectiveness (around $4,000 per ton) can be justified considering that Sea Ray's Merritt Island and Cape Canaveral Plants together will be emitting over 600 tons per year of VOCs of which the major part are hazardous air pollutants. The Department believes that both questions can be answered in the affirmative, but additional information is needed before full-scale controls can be proven feasible for the Cape Canaveral Plant.

Based on a review of the information currently available, the Department finds that differences pointed out by Sea Ray between the proposed Cape Canaveral plant and other controlled facilities are not sufficient to rule out a capture and control system to meet BACT requirements. The Department concludes that there may be cost-effective add-on control technologies that are available for application to Sea Ray's lamination process and that Sea Ray may be able to adapt one or more of them with the assistance of qualified ventilation and control system specialists. Fiberglass boat building ventilation and capture issues may be resolvable by qualified consultants with sufficient experience in industrial ventilation design as has been the case in other industries such as automobile manufacturing.

The facts indicate that Sea Ray may be able to install either a localized pickup/treatment system or an enclosure/treatment system for the application of gel coat and resin while ventilating the rest of the building to a lesser extent than Sea Ray proposed. There is no evidence that a capture and control system will subject workers to higher concentrations of styrene. Either type of capture system should improve the quality of the air inside the lamination building so that net worker exposure will be reduced. Bureau staff who visited Sea Ray's Merritt Island Plant on September 21, 1999, indicated that possibilities exist for further improvement in air quality for workers inside the lamination building, particularly in the hull processing area. They observed that workers doing flow coating inside the hull could probably wear air-supplied respirators but if not, workers would probably benefit from any type of pickup system that would vent the hull itself. A flexible exhaust duct routed through the engine hole and tied into a localized pickup system would be one way of doing this.

Since there are several control options that can be applied, the Department believes that Sea Ray can best make the selection of available control technology to be adapted to its Cape Canaveral Plant. The adaptation can be structured in stepwise fashion according to accepted procedures for implementing and demonstrating new applications; i.e., a pilot-scale project. Thus, a pilot project, designed by Sea Ray and its consultants and approved by the Department, will be required as a condition for issuing a permit for construction of the applicant's proposed facility. Overall specifications for the scope of the project along with a firm schedule for research, installation, and testing is included as a specific condition of the final permit The pilot-scale project is being required under this permit to provide additional information on the technical and economic feasibility of add-on controls.

At a minimum, the pilot project must involve the installation of one or more of the following: a localized pickup system, a permanent booth enclosure, or a movable-enclosure venting and

capture system. For the pilot project to be scaleable to a larger size, the pilot system equipment must be designed to capture for treatment at least 10,000 cfm of exhausted air from the hull lamination area that will contain a single boat hull (minimum of 60 feet in length) while capturing at least 80 percent of the total VOC/HAP emissions from that hull and destroying 95 percent of the captured VOCs. The picture on the following page shows a typical spray booth enclosure designed for boats that can be mounted on wheels or lifted out of the way by an overhead crane. A flexible duct carries the fan exhaust to the control device. The Department estimates that the installed cost of the pilot project including enclosures and/or pickup devices and ductwork along with the destruction device will be in the range of $350,000 to $450,000 (based on equipment costs of $25/cfm and associated installation/startup costs of $10 - $20/cfm).

A reasonable period for the applicant to select a control technology and submit a complete design to the Department for approval would be 120 days after the applicant has begun the lamination process so that production details and refinements that will affect the control system design are known. By the end of the 120-day period, Sea Ray must have hired a qualified consultant experienced specifically in industrial ventilation design for contaminant control and have submitted a proposed design for the control option selected. The design proposal shall include a detailed description of the control option selected, the rationale for its selection, the projected performance in terms of VOC/HAP capture and destruction efficiencies, the projected costs of installation and operation, and a recommended test protocol for evaluating the performance of the pilot project. The Department shall notify the applicant within 30 days of receipt of the design submittal as to whether it will be accepted. If the proposal is not approved, the Department will notify the applicant within the same 30-day period as to what modifications are required to make the proposal acceptable.

Within 180 days following commencement of operation of the pilot system, the pilot project must be installed and operating. A reasonable amount of time for testing and evaluation would be 180 days beyond the deadline for the startup date of the pilot control system. By that time, a VOC/HAP capture efficiency test and a destruction efficiency test shall have been conducted on the pilot system and the results submitted to the Department for evaluation. The Department will analyze the test results or other data provided by the applicant to determine whether a full-scale control system is feasible from a technical, operational or cost standpoint. If the Department determines that full-scale add-on controls constitute BACT, then the Department shall propose to modify the permit and shall provide twelve additional months from the date of submission of test results for installation of a full-scale control system based on the pilot system. The full-scale system, which may augment or replace the pilot system, shall be designed to capture 90 percent of the total VOC/HAP emissions generated in the hull and deck lamination process while destroying 95 percent (85 percent overall control). Appropriate emission limits and compliance requirements for the pilot and/or full-scale VOC/HAP control system shall then be established by the Department and incorporated into the Title V permit for the facility. If the Department determines, based on the test results and other data provided by the applicant, that full-scale add-on controls do not constitute BACT, the pilot program equipment may be removed and the public shall be provided proper notice.

Construction of the buildings and installation of process equipment may begin upon issuance of the permit. Operation of the lamination process may continue following the conclusion of the pilot study and the permittee shall be given a reasonable amount of time to conform to any new

requirements imposed through the permit revision process.

DETAILS OF THE ANALYSIS MAY BE OBTAINED BY CONTACTING:

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Recommended By:

C. H. Fancy, P.E., Chief
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Date:

Approved By:

Howard L. Rhodes, Director
Division of Air Resources Management

Date:

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