Prevention of Significant Deterioration Air Quality Review
Of Chaparral Boats, Inc. - Nashville
Located in Berrien County, Georgia

PRELIMINARY DETERMINATION
Permit Application No. 16624
January 2007

State of Georgia
Department of Natural Resources
Environmental Protection Division
Air Protection Branch

Stationary Source Permitting Program (SSPP)
Prepared by
Katie Gregory – VOC Unit
Modeling Approved by: Laura Warner
Reviewed and Approved by:
Eric Cornwell – VOC Unit Coordinator James Capp – SSPP Manager
Heather Abrams – Chief, Air Protection Branch

SUMMARY

The Environmental Protection Division (EPD) has reviewed the application submitted by Chaparral Boats, Inc. for a permit to remove all previous PSD avoidance limits for Plant Nos. 1 - 5, the construction and operation of Plant No. 7, and the construction and operation of a Wood Coating Operation in Plant No. 3. The proposed project will remove the 249 ton per year VOC limit for Plant Nos. 1, 2, 3 and 4; remove the 150 ton per year VOC limit for Plant No. 5; remove the 49.9 ton per year limit for Plant No. 4 Resin Operations; and remove the 12.0 ton per year VOC limit for Plant No. 4 Gel Coat Booth No. 2. The project also proposes the construction and operation of Plant No. 7, which will include Resin/Lamination Operations, Deck Gel Coat Operations, Hull Gel Coat Operations, Adhesive Operations, Mold Cleaning Operations, Equipment Cleaning Operations, and Material Mixing Operations. The project also proposes the construction and operation of a Wood Coating Operation in Plant No. 3.

The proposed project will result in an increase in emissions from the facility. The sources of these increases in emissions include the removal of previous VOC limits for Plant Nos. 1 through 5, where the greatest sources of VOC emissions are from the Gel Coat Operations, and the Resin/Lamination Operations; and the addition of Plant No. 7, which will have Gel Coat Operations and Resin/Lamination Operations as well.

The proposed removal of all previous PSD avoidance limits and the construction of Plant No. 7 must be evaluated, essentially, as a retroactive PSD review for the entire site as if it were a “Greenfield” site being proposed with no emission limits. VOC emissions exceed 250 tons per year. Potential emissions of all other PSD-regulated pollutants will remain below corresponding PSD significance levels.

Chaparral Boats, Inc. is located in Berrien County, which is classified as “attainment” or “unclassifiable” for SO_2, $PM_{2.5}$ and PM_{10}, NO_X, CO, and ozone (VOC) in accordance with Section 107 of the Clean Air Act, as amended August 1977.

The EPD review of the data submitted by Chaparral Boats, Inc. related to the proposed modifications indicates that the project will be in compliance with all applicable state and federal air quality regulations.

It is the preliminary determination of the EPD that the proposal provides for the application of Best Available Control Technology (BACT) for the control of VOC emissions, as required by federal PSD regulation 40 CFR 52.21(j). BACT has been determined to be pollution prevention measures equivalent to those required for new boat manufacturing operations by 40 CFR 63 Subpart VVVV (“Boat MACT”).

It has been determined through approved modeling techniques that the estimated emissions will not cause or contribute to a violation of any ambient air standard in the area surrounding the facility or in Class I areas located within 200 km of the facility. It should be noted that while VOC is a precursor to ozone, there is no NAAQS or PSD increment level for VOC itself. It has further been determined that the proposal will not cause impairment of visibility or detrimental effects on soils or vegetation. Any air quality impacts produced by project-related growth should be inconsequential.

This Preliminary Determination concludes that an Air Quality Permit should be issued to Chaparral Boats, Inc. for the modifications necessary to remove all previous PSD avoidance limits for Plant Nos. 1 - 5, the construction and operation of Plant No. 7, and the construction and operation of a Wood Coating Operation in Plant No. 3. Various conditions have been incorporated into the current Title V Operating Permit to ensure and confirm compliance with all applicable air quality regulations. A copy of the draft permit amendment is included in Appendix A.

1.0 INTRODUCTION

On February 27, 2006, Chaparral Boats, Inc. (hereafter Chaparral) submitted an application for an Air Quality Permit to remove all previous PSD avoidance limits for Plant Nos. 1 - 5, the construction and operation of Plant No. 7, and the construction and operation of a wood coating operation in Plant No. 3. The facility is located at 300 Industrial Park Boulevard in Nashville, Berrien County.

Based on the proposed project description and data provided in the permit application, the estimated emissions of regulated pollutants from the facility are listed in Table 1 below.

Table 1: Emissions from the Project

Pollutant	Future Actual Emissions (tpy)	Potential Emissions (tpy)	PSD Significant Emission Rate (tpy)	Subject to PSD Review
PM	3.28	14.51	25	No
PM_{10}	3.24	14.23	15	No
VOC	428.07	2680.28	40	Yes
NO_X	7.33	32.11	40	No
CO	6.16	26.98	100	No
SO_2	0.04	0.19	40	No
TRS	-	-	10	No
Pb	-	-	0.6	No
Fluorides	-	-	3	No
H_2S	-	-	10	No
SAM	-	-	7	No

The future actual emissions is the emission rate, in tons per year, from the entire facility including Plant No. 7 and the Wood Coating Operation in Plant No. 3, based on the potential emissions scaled down to 2000 operating hours per year. 2000 hours of operation were based on actual operating hours from July 2003 through June 2005. The potential VOC emissions are based on the throughput of raw materials (gel coats, resins, adhesives, solvents, etc.), which were derived from the highest monthly usage from November 2003 through October 2005. Material usage rates for Plant No. 7 were based on the maximum values from Plant No. 1. The above emissions also include the emissions from the woodshops, and process heaters. The emissions calculations for Table 1 can be found in detail in the facility's PSD application (see Attachment D of Application No. 16624).

Based on the information presented in Table 1 above, Chaparral's proposed modification, as specified per Georgia Air Quality Application No. 16624, is classified as a major modification under PSD because the potential emissions of VOC. Because the majority of potential emissions increases result from the removal of PSD avoidance limits, this project will be reviewed as if Chaparral were proposing "Greenfield" construction of this entire facility without any emission limits.

Through its new source review procedure, EPD has evaluated Chaparral's proposal for compliance with State and Federal requirements. The findings of EPD have been assembled in this Preliminary Determination.

2.0 PROCESS DESCRIPTION

According to Application No. 16624, Chaparral has proposed to remove all previous PSD avoidance limits for Plant Nos. 1 - 5, the construction and operation of Plant No. 7, and the construction and operation of a Wood Coating Operation in Plant No. 3. The proposed project will remove the 249 ton per year VOC limit for Plant Nos. 1, 2, 3 and 4; remove the 150 ton per year VOC limit for Plant No. 5; remove the 49.9 ton per year limit for Plant No. 4 Resin Operations; and remove the 12.0 ton per year VOC limit for Plant No. 4 Gel Coat Booth No. 2. The project also proposes the construction and operation of Plant No. 7, which will include Resin/Lamination Operations, Deck Gel Coat Operations, Hull Gel Coat Operations, Adhesive Operations, Mold Cleaning Operations, Equipment Cleaning Operations, and Material Mixing Operations.

Overall Operations

Chaparral Boats manufactures large, recreational, stern driven boats, ranging in length from 18 feet (SSI Sport Boats) to 37 feet in length (Signature Series). All of the manufacturing plants (Plant Nos. 1 through 5 and 7) need the flexibility to manufacture all models of boats including the signature series and larger. The boats are built from the outside of the hull to the inside and are built around pre-made molds. The molds are usually made of fiberglass and are used repeatedly. The molds (hulls) are cleaned and waxed, and a layer of gel coat is sprayed on the molds and allowed to cure. A thin layer of resin (skin coat) is then applied over the first layer of gel coat. The skin coat aids in the adhesion of the gel coat to the resin. As the boat hulls begin the lamination process, layers of unfilled resin, chopped fiberglass strands, and glass mat are applied to the bottom and the sides of the boat, usually several layers of resin/fiberglass make up the laminate for the hull. The gelcoat, skin coat and lamination are all performed in a large, open area with a mobile equipment setup because of the size and weight of the molds. Movement of the products is minimized to protect worker safety and reduce wear on the building foundation. Large fans are used to remove styrene emissions from the workplace. The molded piece is then removed from the mold and trimmed. Once the laminated hull has cured, it is removed from the mold via a system of overhead cranes and/or fork lifts to the assembly area of each plant. The boat deck and hulls are then assembled, and any motors and/or necessary wiring and furniture are then installed. The facility operates small wood shops for producing wooden parts and cabinets for the boats.

Plant No. 1 operations include deck gel coat, hull gel coat, resin/lamination, adhesive, equipment cleaning, mold cleaning, and material mixing. Plant No. 2 operations include cutting, sewing and adhesive. Plant No. 3 operations include gel coat, resin/lamination, adhesive, equipment cleaning, mold cleaning, material mixing, research and development, and wood coating. Plant No. 4 operations include gel coat, small parts gel coat booth, resin/lamination, adhesive, equipment cleaning, mold cleaning, and material mixing. Plant No. 5 operations include deck gel coat, hull gel coat, resin/lamination, adhesive, equipment cleaning, mold cleaning, and material mixing. Plant No. 7 operations will include deck gel coat, hull gel coat, resin/lamination, adhesive, equipment cleaning, mold cleaning and material mixing. A more detailed description for each of these operations is given in the paragraphs below.

Inspection of the facility affirmed the large scale of the facility and the final products. The size of the boat hulls and some of the decks does not allow a booth or booths to be constructed to capture airflows in amounts that lead to good control efficiency with add-on control devices. Most of the production occurs around a stationary hull/deck. The equipment for the gel coats and resins is mobile and is transferred between the product parts. Due to the inability for quality production to occur in booths, any control equipment installed on the buildings would have to be equipped to handle large amounts of airflow with small concentrations of pollutants.

Facility Emissions

Table 2 shows the potential VOC emissions from the facility by emission unit. The emissions were calculated using the July 2001 version of the Unified Emission Factors (UEF) for open molding of composites as published by the American Composites Manufacturers Association (ACMA). Emissions from the cleaning operations and wood coating operations are based on the assumption that 100 percent of VOC used is emitted. The equipment cleaning operations also include the storage of any cleaning solvents, with the use of acetone as the primary cleaning solvent. Acetone is not designated a VOC, therefore, the VOC emissions from these operations are considered to be zero (0.0) tpy. Emissions from material mixing are accounted for in the respective resin and gel coat operations.

Table 2: Potential VOC Emissions

Plant No.	Emission Unit ID No.	Emission Unit Description	Potential VOC Emissions (tpy)
1	P1DB	Deck Gel Coat Operations	129.49
	P1HB	Hull Gel Coat Operations	129.49
	P1LA	Resin/Lamination Operations	270.18
	P1AO	Adhesive Operations	30.36
	P1EC	Equipment Cleaning Operations	0
	P1MC	Mold Cleaning Operations	6.44
	P1MX	Material Mixing Operations	0
2	P2AO	Plant No. 2 Adhesive Operations	56.18
3	P3GC	Gel Coat Operations	220.29
	P3LA	Resin/Lamination Operations	223.35
	P3AO	Adhesive Operations	34.32
	P3EC	Equipment Cleaning Operations	0
	P3MC	Mold Cleaning Operations	10.69
	P3MX	Material Mixing Operations	0
	RDML	R&D Mold Lamination Operations	33.83
	P3WC	Wood Coating Operations	12.88
4	P4GB	Gel Coat Operations No. 1	111.1
	P4G2	Gel Coat Booth No. 2	27.78
	P4LA	Resin/Lamination Operations	142.88
	P4AO	Adhesive Operations	0
	P4EC	Equipment Cleaning Operations	0
	P4MC	Mold Cleaning Operations	5.08
	P4MX	Material Mixing Operations	0
5	P5DB	Deck Gel Coat Operations	167.64
	P5HB	Hull Gel Coat Operations	167.64
	P5LA	Resin/Lamination Operations	303.53
	P5AO	Adhesive Operations	31.78
	P5EC	Equipment Cleaning Operations	0
	P5MC	Mold Cleaning Operations	9.11
	P5MX	Material Mixing Operations	0
7	P7DG	Deck Gel Coat Operations	129.49
	P7HG	Hull Gel Coat Operations	129.49
	P7LA	Resin/Lamination Operations	270.18
	P7AO	Adhesive Operations	18.89
	P7EC	Equipment Cleaning Operations	0
	P7MC	Mold Cleaning Operations	6.44
	P7MX	Material Mixing Operations	0
		Total VOC Emissions	**2,678.52**

Resin/Lamination

Plant Nos. 1, 3, 4, and 5 operate several resin/lamination stations comprising the resin/lamination operations areas, to apply the resin to the boat hull molds. Plant No. 7 will operate its own resin/lamination operation. The facility uses fluid impingement technology (FIT) applicators in the resin stations. The use of FIT guns is considered a non-atomized application method. The emissions from the resin/lamination operations include VOCs, HAPs, and minimal amounts of particulate matter. In the resin/lamination area, a thin layer of resin (skin coat) is applied to the outer layer of gel coat that makes up the outside of the boat hull. Then several layers of resin are applied between layers of glass mat. The boat hull and deck are laminated separately. The deck area is formed in a similar manner as that of the boat hulls. The facility uses pre-made molds of the deck and applies a thin layer of resin followed by alternating layers of resin and fiberglass mat. Potential VOC emissions from all resin/lamination operations total 1,210 tons per year.

Gel Coat Operations

The boat building Plant Nos. 1, 3, 4, and 5 have several gel coat spray guns that are dedicated to applying gel coat to the boat decks and hulls and comprise the Gel Coat Operations for the site. Plant No. 4 has a small parts booth for gel coat. Plant No. 7 will operate its own gel coat operations. The gel coat guns are manufactured by Magnum. The boat decks and hulls are formed as a single mold and include the built-in seating areas for the boats. The boat deck and hull is formed with the outer most gel coat layer applied first to the mold. After the first gel coat layer is applied, the resin and fiberglass mat is applied via the resin /lamination area. Potential VOC emissions from all gel coat operations total 1,212 tons per year.

Research and Development Mold Laminating

The facility operates research and development operations pertaining to the construction of new boat molds and plugs. Molds are used to manufacture the boats themselves while plugs are usually constructed from wood and are used to manufacture the molds. The R&D Mold Laminating operations will create the fiberglass molds in a similar manner as the fiberglass boats are produced. Tooling gel coats and vinyl ester resins are typically used in the production of molds. The VOC and HAP emissions from these operations are minimal as new molds are infrequently produced. Potential VOC emissions from research and development are 34 tons per year.

Adhesive Operations

The site currently uses adhesives to adhere carpeting, fabrics, and other small parts to the boats. Additionally, the new manufacturing plant (Plant No. 7) will use adhesives to glue the carpeting and other fabric onto the boats. The application of these materials comprises the Adhesive operations. The adhesives contain heptane (28 %, by weight) and ethyl acetate (12 %, by weight) and have a VOC content of approximately 40 percent. Potential VOC emissions from all adhesive operations total 172 tons per year.

Equipment Cleaning Operations

The facility has equipment cleaning operations that include the flush cleaning of FIT and spray guns for the resin and gel coat operations. Plant No. 7 will also have equipment cleaning operations. The equipment cleaning operations also include the storage of any cleaning solvents, with the use of acetone as the primary cleaning solvent. Acetone is not designated a VOC, therefore, the VOC emissions from these operations are considered to be zero (0.0) tpy. The facility also uses acetone and bead blasters to remove cured resins. The equipment cleaning operations in Plant Nos. 1, 4, and 5 have previously been grouped with the resin/lamination operations but now have their own designation.

Material Mixing Operations

The entire site (including the proposed Plant No. 7) has several mixing tanks for resins and gel coats. The VOC emissions from these operations are considered insignificant under Title V permitting but for completeness have been assessed for PSD applicability. In Table 2, emissions from material mixing are accounted for in the respective resin and gel coat operations in Plant Nos. 1, 3, 4, 5, and 7.

Mold Cleaning Operations

The site will clean the molds in Plant Nos. 1, 3, 4, and 5 after the boat hulls and decks are lifted out of their respective molds. Plant No. 7 will also have mold cleaning operations. The mold cleaning operations will normally use acetone (non-VOC) and only use MEK and toluene to removed cured resin in the molds, therefore, the VOC emissions from these operations are minimal. The potential VOC emissions from all mold cleaning are 38 tons per year.

Wood Coating Operations

The only wood coating operations will be at Plant No. 3. Wood coating operations produce furniture and woodwork that is integral to the boat cabin for the larger boats. The wood coating operations normally use solvent based lacquers and sealers at a maximum rate of 30 gallons per week total (total usage for Plant No. 3 wood coating operation of 1,560 gallons per year). The VOC content of the lacquers can be as high as 75 percent, by weight. The wood coating will be applied in a discrete spray booth equipped with a dry filter to control particulate matter. Emissions will exit out of a single vertical uncapped stack. The spray applicator used will be a conventional atomized spray gun. The potential VOC emissions from the wood coating operations are 13 tons per year.

3.0 REVIEW OF APPLICABLE RULES AND REGULATIONS

State Rules

Georgia Rule for Air Quality Control (Georgia Rule) 391-3-1-.03(1) requires that any person prior to beginning the construction or modification of any facility which may result in an increase in air pollution shall obtain a permit for the construction or modification of such facility from the Director upon a determination by the Director that the facility can reasonably be expected to comply with all the provisions of the Act and the rules and regulations promulgated thereunder. Georgia Rule 391-3-1-.03(8)(b) continues that no permit to construct a new stationary source or modify an existing stationary source shall be issued unless such proposed source meets all the requirements for review and for obtaining a permit prescribed in Title I, Part C of the Federal Act [i.e., Prevention of Significant Deterioration of Air Quality (PSD)], and Section 391-3-1-.02(7) of the Georgia Rules (i.e., PSD).

Georgia Rule (b) [391-3-1-.02(2)(b)]

This is a general rule limiting the opacity of emissions from a source to less than 40 percent. The resin operations (Emission Unit ID Nos. P1LA, P3LA, P4LA, P5LA, and P7LA) at the facility maintain compliance with this opacity limit via the use of FIT application devices. The facility uses dry filters (APCD ID Nos. P1DF, P1HF, P3CF, P3F1 through P3F6, P4GF, P4F2, P5DF, P5HF, P7DF, and P7HF) to control particulate matter (overspray) emissions from the gel coat and wood coating operations (Emission Unit ID No. P1DB, P1HB, P3WC, P3GC, P4GB, P4G2, P5DB, P5HB, P7HG, P7DG).

This modification will have no impact on the regulatory applicability of Rule (b) or its ability to comply with the opacity standard of the rule. Condition 3.4.1 of the facility's Title V operating permit incorporates this opacity standard.

Georgia Rule (e) [391-3-1-.02(2)(e)]

Commonly known as the process weight rule, it limits PM emissions based on either of one of three equations, depending on the process input rate and age of the equipment, where E = emission rate (lb/hr) and P = process input rate (ton/hr). The facility is subject to the standard expressed by the following equation in Georgia Rule (e), for existing equipment and for process input less than or equal to 30 tons per hour.

$$E = 4.1 (P^{0.67})$$

The resin operations (Emission Unit ID Nos. P1LA, P3LA, P4LA, P5LA, and P7LA) at the facility maintain compliance via the use of FIT application devices. The facility uses dry filters (APCD ID Nos. P1DF, P1HF, P3CF, P3F1 through P3F6, P4GF, P4F2, P5DF, P5HF, P7DF, and P7HF) to control particulate matter (overspray) emissions from the gel coat and wood coating operations (Emission Unit ID No. P1DB, P1HB, P3WC, P3GC, P4GB, P4G2, P5DB, P5HB, P7HG, P7DG). The facility will monitor the pressure drop across the filters once per shift to ensure proper operation and to comply with indoor air quality standards. Controlled particulate matter emissions from the facility are minimal with potential PM emissions from the entire site operations (including Plant No. 7) of 14.5 tpy.

This rule is incorporated as Condition No. 3.4.2 of the facility's Title V operating permit. This modification will have no effect on the applicability of Rule (e) or its ability to comply with the particulate matter emissions standard of the rule.

Georgia Rule (tt) [391-3-1-.02(2)(tt)]

This rule is titled "VOC Emissions from Major Sources" and commonly known as the VOC RACT Rule. This rule requires Reasonably Available Control Technology for sources emitting over 100 tons per year of VOC emissions from facilities located in specific counties listed within the regulation. Berrien County is not among this list and therefore this regulation does not apply to this facility or this modification.

Georgia Rule (hhh) [391-3-1-.02(2)(hhh)]

This rule is titled, "Wood Furniture Finishing and Cleaning Operations" and regulates VOC emissions from wood furniture finishing and cleaning. However, this rule applies only to facilities with these operations located in Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Paulding and Rockdale that emit over 25 tons of VOC per year, or located in Bartow, Carroll, Hall Newton, Spaulding and Walton that emit over 100 tons of VOC per year. Chaparral is not located in any of these named counties and therefore is not subject to this rule.

Federal Rule - PSD

The regulations for PSD in 40 CFR 52.21 require that any new major source or modification of an existing major source be reviewed to determine the potential emissions of all pollutants subject to regulations under the Clean Air Act. The PSD review requirements apply to any new or modified source which belongs to one of 28 specific source categories having potential emissions of 100 tons per year or more of any regulated pollutant, or to all other sources having potential emissions of 250 tons per year or more of any regulated pollutant. They also apply to any modification of a major stationary source which results in a significant net emission increase of any regulated pollutant.

The PSD regulations require that any major stationary source or major modification subject to the regulations meet the following requirements:

- Application of Best Available Control Technology (BACT) for each regulated pollutant that would be emitted in significant amounts;
- Analysis of the ambient air impact;
- Analysis of the impact on soils, vegetation, and visibility;
- Analysis of the impact on Class I areas; and
- Public notification of the proposed plant in a newspaper of general circulation

Definition of BACT

The PSD regulation requires that BACT be applied to all regulated air pollutants emitted in significant amounts. Section 169 of the Clean Air Act defines BACT as an emission limitation reflecting the maximum degree of reduction that the permitting authority (in this case, EPD), on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such a facility through application of production processes and available methods, systems, and techniques. In all cases BACT must establish emission limitations or specific design characteristics at least as stringent as applicable New Source Performance Standards (NSPS). In addition, if EPD determines that there is no economically reasonable or technologically feasible way to measure the emissions, and hence to impose and enforceable emissions standard, it may require the source to use a design, equipment, work practice or operations standard or combination thereof, to reduce emissions of the pollutant to the maximum extent practicable.

The BACT determination should, at a minimum, meet two core requirements.[1] The first core requirement is that the determination follow a "top-down" selection approach. The second core requirement is that the selection of a particular control system as BACT must be justified in terms of the statutory criteria and supported by the record and must explain the basis for the rejection of other more stringent candidate control systems.

EPD's procedures for performing a top down BACT analysis are set forth in EPA's Draft New Source Review Workshop Manual (Manual), dated October 1990. One critical step in the BACT analysis is to determine if a control option is technically feasible.[2] If a control is determined to be infeasible, it is eliminated from further consideration. The Manual applies several criteria for determining technical

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[1] The discussion of the core requirements is taken from the Preamble to the Proposed NSR Reform, 61 FR 38272.

[2] Discussion on technical feasibility is taken from the PSD Final Determination for AES Londonberry, L.L.C., Rockingham County, New Hampshire, authored by the U.S. EPA Region I, Air Permits Program.

feasibility. The first is straightforward: if the control has been installed and operated by the type of source under review, it is demonstrated and technically feasible.

For controls not demonstrated using this straightforward approach, the Manual applies a more complex approach that involves two concepts for determining technical feasibility: availability and applicability. A technology is considered available if it can be obtained through commercial channels. An available control is applicable if it can be reasonably installed and operated on the source type under construction. A technology that is available and applicable is technically feasible.

The Manual provides some guidance for determining availability. For example, a control is generally considered available if it has reached the licensing and permitting stages of development. However, the Manual further provides that a source would not be required to experience extended time delays or resource penalties to allow research to be conducted on new technologies. In addition, the applicant is not expected to experience extended trials learning how to apply a technology on a dissimilar source type. Consequently, technologies in the pilot scale testing stages of development are not considered available for BACT.

As mentioned before, the Manual also requires available technologies to be applicable to the source type under construction before a control is considered technically feasible. For example, deployment of the control technology on the existing source with similar gas stream characteristics is generally a sufficient basis for concluding technical feasibility. However, even in this instance, the Manual would allow for an applicant to make a demonstration on the contrary. For example, an applicant could show that unresolved technical difficulties with applying a control to the source under consideration (e.g., size of the unit, location of the proposed site, and operating problems related to the specific circumstances of the source) make a control technically infeasible.

According to the Environmental Appeals Board (see In re: Kawaihae Cogeneration Project, 7 E.A.D. 107 at page 1996, EAB 1997), the section on "collateral environmental impacts" of a proposed technology has been interpreted to mean that "if application of a control system results directly in the release (or removal) of pollutants that are not currently regulated under the Act, the net environmental impact of such emissions is eligible for consideration in making the BACT determination." The Appeals Board continues, "The Administration has explained that the primary purpose of the collateral impacts clause is… to temper the stringency of the technological requirements whenever one or more of the specified collateral impacts – energy, environmental, or economic – renders the use of the most effective technology inappropriate." Lastly, the Appeals Board states, "Unless it is demonstrated to the satisfaction of the permit issuer that such unusual circumstances exist, then the permit applicant must use the most effective technology."

The five steps of a top-down BACT review procedure identified by EPA per BACT guidelines are listed below:

Step 1: Identification of all control technologies;
Step 2: Elimination of technically infeasible options;
Step 3: Ranking of remaining control technologies by control effectiveness;
Step 4: Evaluation of the most effective controls and documentation of results; and
Step 5: Selection of BACT.

The following is a discussion of the applicable federal rules and regulations pertaining to the equipment that is the subject of this preliminary determination, which is then followed by the top-down BACT analysis.

New Source Performance Standards

No equipment in this modification is subject to any specific New Source Performance Standards.

National Emissions Standards For Hazardous Air Pollutants

Federal Rule – 40 CFR 63 Subpart A

40 CFR 63 Subpart A, *General Provisions*, imposes generally applicable provision for initial notifications, initial compliance testing, monitoring, and recordkeeping requirements. The facility must comply with the general provisions because equipment at the facility is subject to 40 CFR 63 Subparts VVVV, and DDDDD. The proposed modification will not alter the applicability of Subpart A to the any other process equipment at the facility.

Federal Rule – 40 CFR 63 Subpart JJ

The facility is not subject to the requirements of 40 CFR Part 63 Subpart JJ "Wood Furniture Manufacturing Operations NESHAP," because USEPA has determined that wood furniture on a boat is integral to the boat cabin and is not comparable to the furniture regulated under NESHAP Subpart JJ (see section V.C. of the preamble to the proposed Boat Manufacturing NESHAP, page 43855 of FR, July 14, 2000).

Federal Rule – 40 CFR 63 Subpart DDDDD

40 CFR 63 Subpart DDDDD, *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process,* regulates HAP emissions from solid, liquid, and gaseous fuel fired boilers and indirect process heaters that are located at a facility that is a major sources of HAPs. The facility has fuel burning sources that can be classified as process heaters (indirect fired hanging furnaces). The process heaters at Plant Nos. 1, 2, 3, 4, 5, and 7 are classified as existing small gaseous fuel process heaters. 40 CFR 63.7506(c) specifies that the facility does not need to submit an initial notification or comply with any requirements for these types of units.

Federal Rule – 40 CFR 63 Subpart VVVV

40 CFR 63 Subpart VVVV "NESHAP for Boat Manufacturing" applies to all facilities that are engaged in boat manufacturing and are major sources of hazardous air pollutants (HAPs). A major source facility emits equal to or greater than 10 tpy of an individual HAP and/or 25 tpy of combined HAPs. NESHAP Subpart VVVV will require the facility to limit HAP emissions from the resin, gel coats, solvents, and adhesives used at the boat manufacturing affected source.

The facility has three options for complying with the NESHAP for resin and gel coats. Option one is the material compliant option which allows sources to comply with the HAP limit in the NESHAP as long as the 12-month rolling average HAP content for the resin or gel coat category is at or below the specified limit. In order to use the compliance material option all categories of resin and gel coat must be at or below their respective limits. Option two is the MACT model point value averaging option (emissions averaging) which allows the facility to determine a HAP limit (based upon the amount of each type of resin or gel coat used) and compare it to the HAP emissions as calculated by the formula presented in the NESHAP. The source is in compliance if the 12-month rolling total HAP emissions for each month is below the calculated HAP limit. Option three allows the facility to use add-on controls to demonstrate compliance with the HAP limit.

The compliance date for existing sources subject to NESHAP Subpart VVVV was August 23, 2004. Chaparral Boats is considered an existing source since the facility was constructed before July 14, 2000. The specifics of the Boat Manufacturing NESHAP, Subpart VVVV, are described below in greater detail.

The facility must limit the emissions of HAP from open molding resin and gel coat operations to below the following HAP limit which is the total allowable organic HAP (in kilograms) that can be emitted from the open molding operations.

$$\text{HAP Limit} = 46M_R + 159M_{PG} + 291M_{CG} + 54M_{TR} + 241M_{TG}$$

Where,

M_R = mass of production resin used (in megagrams) in the past 12 months, excluding any exempt materials

M_{PG} = mass of pigmented gel coat used (in megagrams) in the past 12 months, excluding any exempt materials

M_{CG} = mass of clear gel coat used (in megagrams) in the past 12 months, excluding any exempt materials

M_{TR} = mass of tooling resin used (in megagrams) in the past 12 months, excluding any exempt materials

M_{TG} = mass of tooling gel coat used (in megagrams) in the past 12 months, excluding any exempt materials

As described above, the facility has three options of complying with this emission limit; the use of compliant materials, the use of an emissions averaging method, or the use of add-on controls. The facility will use the emissions averaging provisions and the compliant material options to demonstrate compliance.

Under the emissions averaging provisions, the facility determines the 12-month rolling total HAP emissions each month per the following formula:

$$\text{HAP Emissions} = PV_R M_R + PV_{PG} M_{PG} + PV_{CG} M_{CG} + PV_{TR} M_{TR} + PV_{TG} M_{TG}$$

Where,

HAP Emissions = Organic HAP emission calculated using MACT model point values for each operation included in the average (in kilograms).

PV_R = Weighted-average MACT model point value for production resin used in the past 12 months (in kilograms per megagram).

M_R = Mass of production resin used in the past 12 months (in megagrams).

PV_{PG} = Weighted-average MACT model point value for pigmented gel coat used in the past 12 months (in kilograms per megagram).

M_{PG} = Mass of pigmented gel coat used in the past 12 months (in megagrams).

PV_{CG} = Weighted-average MACT model point value for clear gel coat used in the past 12 months (in kilograms per megagram).

M_{CG} = Mass of clear gel coat used in the past 12 months (in megagrams).

PV_{TR} = Weighted-average MACT model point valued for tooling resin used in the past 12 months (in kilograms per megagram).

M_{TR} = Mass of tooling resin used in the past 12 months (in megagrams).

PV_{TG} = Weighted-average MACT model point value for tooling gel coat used in the past 12 months (in kilograms per megagram).

M_{TG} = Mass of tooling gel coat used in the past 12 months (in megagrams).

The MACT model point values are determined using Table 3-1.

Table 3-1

Operation Type	**Application Method**	**Formula to calculate PV_i for each resin and gel coat**
Production resin, tooling resin	a. Atomized b. Nonatomized	0.014 x (Resin HAP%)$^{2.425}$ 0.014 x (Resin HAP%)$^{2.275}$
Pigmented gel coat, clear gel coat, tooling gel coat	All methods	0.445 x (Gel coat HAP%)$^{1.675}$

If the calculated HAP emissions are below the calculated HAP emissions limit then the facility is in compliance.

The facility can also demonstrate compliance if the average HAP content of each and every gel coat or resin in their respective resin or gel coat category is below the limit specified in Table 3-2.

Table 3-2

Operational Category	Application Method	The weighted-average organic HAP content must not be exceeded
1. Production resin operations…...	Atomized (spray)	28 percent.
2. Production resin operations…...	Nonatomized (nonspray)	35 percent.
3. Pigmented gel coat operations…	Any method	33 percent.
4. Clear gel coat operations………	Any method	48 percent.
5. Tooling resin operations………	Atomized (spray)	30 percent.
6. Tooling resin operations………	Nonatomized (nonspray)	39 percent.
7. Tooling gel coat operations……	Any method	40 percent.

The HAP content for each category is determined each month on a 12-month rolling total basis.

The facility's resin and gel coat mixing operations must comply with work practice standards that require monthly inspections of all containers for resin and gel coat to ensure that lids are closed except for the removal or addition of material. The facility's equipment cleaning operations must also comply with similar work practices requirements. Solvents used for equipment cleaning operations must contain no more than 5 percent HAP, by weight.

Federal Rule – 40 CFR 64 – Compliance Assurance Monitoring

Under 40 CFR 64, the *Compliance Assurance Monitoring* Regulations (CAM), facilities are required to prepare and submit monitoring plans for certain emission units with the Title V application. The CAM Plans provide an on-going and reasonable assurance of compliance with emission limits. Under the general applicability criteria, this regulation applies to units that use a control device to achieve compliance with an emission limit and whose pre-controlled emissions levels exceed the major source thresholds under the Title V permitting program. Although other units may potentially be subject to CAM upon renewal of the Title V operating permit, such units are not being modified under the proposed project and need not be considered for CAM applicability at this time.

Therefore, this applicability evaluation only addresses the removal of all previous PSD avoidance limits for Plant Nos. 1 - 5, the construction and operation of Plant No. 7, and the construction and operation of a wood coating operation in Plant No. 3, which does not employ any air pollution control devices; therefore, the CAM requirements are not triggered by the proposed modification.

4.0 CONTROL TECHNOLOGY REVIEW

The proposed project will result in increased emissions of a number of pollutants, including NOx, CO, VOC, SO_2, PM and PM_{10}. However, only the increased emissions of VOCs are significant enough to trigger PSD review.

The removal of all previous PSD avoidance limits includes the removal of the 249 ton per year VOC limit for Plant Nos. 1, 2, 3 and 4; removal of the 150 ton per year VOC limit for Plant No. 5; removal of the 49.9 ton per year limit for Plant No. 4 Resin Operations; and removal of the 12.0 ton per year VOC limit for Plant 4 Gel Coat Booth No. 2. There are no control devices associated with maintaining compliance with these emissions limits. Primary emissions from the removal of all previous PSD avoidance limits are VOC emissions. VOC emissions are emitted from the boat manufacturing operations due to the use of resins, gel coats, adhesives, and solvents. Styrene and methyl methacrylate (MMA) are off-gased from the laminated hulls and decks as well as the gel coated surfaces of the boats.

Because only the VOC emissions increase from the removal of previous PSD avoidance limits has triggered PSD applicability, only the VOC emissions were evaluated for Best Available Control Technology (BACT). The increase in NOx, CO, VOC, SO_2, PM and PM_{10} emissions from the removal of previous PSD avoidance limits in the proposed modification does not exceed the PSD significant modification threshold; therefore NOx, CO, VOC, SO_2, PM and PM_{10} emissions from the removal of previous PSD avoidance limits were not evaluated for BACT-level controls.

Step 1: Identify all control technologies

In reviewing the BACT alternatives to control emissions of VOC from the facility, Chaparral Boats reviewed all applicable BACT determinations for fiberglass boat manufacturing facilities as specified in Table 4. Because of Chaparral Boats' review, regenerative thermal oxidation, catalytic oxidation, carbon adsorption systems, scrubbers, condensation systems, pollution prevention, bio-filtration systems and closed molding were considered as control options as noted in Table 5.

Table 4: BACT Determinations for Boat Manufacturing Facilities

Company Name	Location	Database	Permit Date	Facility Description	VOC Control/ Limitations	Control Type	BACT[1] Considered
Sea-Pro Boats	Newberry, South Carolina	RBLC	06/15/04	Fiberglass Boat Mfg.	Limit VOC in resin to 35 % and gel coat to 33 %, by weight	BACT	Yes
Sea Fox	Charleston, South Carolina	RBLC	12/23/02	Boat Mfg. gel coat/ resin	Limit VOC in resin to 35 %, by weight.	BACT	Yes
Sanger Boats	Fresno, California	RBLC	03/21/96	Boat Mfg. gel coat/resin	Limit VOC in resin to 35 %, Air-less spray guns, use of non-VOC solvent.	BACT	Yes
Bullet Fiberglass	Madera, California	RBLC	06/30/95	Boat repair	Use of low VOC resins and gel coats	BACT	Yes
Tracker Marine	Clinton, Missouri	RBLC	12/09/94	Boat Mfg.	Increase stack height to ensure	BACT	Yes

Table 4: BACT Determinations for Boat Manufacturing Facilities

Company Name	Location	Database	Permit Date	Facility Description	VOC Control/ Limitations	Control Type	BACT[1] Considered
					safe ambient concentrations of HAPs		
Sunbird Boat	Columbia, South Carolina	RBLC	12/13/91	Gel coat booth and Lamination	50 % acetone replacement, limit styrene in gel coat to 37 %, by weight	BACT	Yes
Thompson Boat Co.	St. Charles, Michigan	RBLC	9/15/89	Gel coat and resin appl.	Use of air-less application equipment for resin and gel coat	BACT	Yes
Stratos Boats	Murfreesboro, Tennessee	RBLC	08/07/89	Gel coat and lamination	Low styrene resins use of acetone cleaning solvent	BACT	Yes
Chaparral Boats	Nashville, Georgia	GAEPD Title V website	08/23/00	Gel coat and resin lamination	Limit styrene to 35 % for resin. Limit styrene to 34 % for gel coat.	Case-by-case MACT	Yes
Bombardier	Benton, Illinois	Region 5 permit website	07/19/01 (Title V date)	Automated boat Mfg line (personal watercraft)	Use of thermal oxidizer to control automated assembly line (AAL)	BACT	No
Navigator Yachts	Perris, California	SCAQMD	9/23/03	Custom Yacht Mfg	Use of carbon adsorption/ thermal oxidizer system	BACT (LAER)	No

1 If the BACT determination was used in selecting the Best Available Control Technology

Table 5: Evaluated Control Options

Option 1: Carbon Adsorption Systems
Option 2: Scrubbers
Option 3: Condensation Systems
Option 4: Closed Molding Systems
Option 5: Bio-Filtration Systems
Option 6: Regenerative Thermal Oxidation (Equipment Cleaning and Material Mixing Operations)
Option 7: Regenerative Catalytic Oxidation (Equipment Cleaning and Material Mixing Operations)
Option 8: Regenerative Thermal Oxidation (Resin and Gel Coat Operations)
Option 9: Regenerative Catalytic Oxidation (Resin and Gel Coat Operations)
Option 10: Pollution Prevention

Step 2: Eliminate technically infeasible options

Option 1 – Carbon Adsorption Systems

Carbon adsorption systems can potentially be used to remove VOC from the gas streams. The core component of a carbon adsorption system is an activated carbon bed contained in a steel vessel. The VOC-laden gases pass through the carbon bed, and the VOC is adsorbed on the activated carbon. The cleaned gas is discharged to the atmosphere. The spent carbon is regenerated either at an on-site regeneration facility or by an off-site activated carbon supplier. Using steam to replace adsorbed organic compounds at high temperatures regenerates the spent carbon.

Carbon adsorption is a technically infeasible option for the control of most VOC emissions, including styrene, because of the low activated carbon adsorptivity of the VOC. In addition, the high-molecular weight of condensable VOC compounds (styrene has a MW of 104.2lbs/lb-mole) will coat the carbon, leading to increased operational difficulties and decreased removal efficiencies. A final consideration is that the low inlet VOC concentrations of open molding processes will hinder the effectiveness of the system.

A USEPA report indicates that carbon adsorption systems can routinely achieve VOC outlet concentrations as low as 50 parts per million (ppm). The report also indicates that high removal efficiencies (at least 90 percent) are not routinely found at inlet concentrations less than 100 ppm. Carbon adsorption would not provide an adequate level of control and is deemed technically infeasible for operations with gas stream VOC concentrations below 100 ppm. Chaparral Boats' waste gas streams are well below 100 ppm and usually in the 10 to 35 ppm range (32.7 ppm for an estimated flow rate of 72,000 acfm per Attachment F, Figure F-1 of the facility's PSD application, Application No. 16624).

Based on these findings, the facility considers this control option technically infeasible, and did not consider Option 1 any further in this VOC BACT evaluation. The Division agrees with the above assessment.

Option 2 – Scrubber Systems

VOC from a waste gas stream can be removed by utilizing a scrubbing liquid. Mass transfer of the VOC occurs when the scrubbant liquid contacts the waste gas stream. The VOC is absorbed into the scrubbing liquid and removed from the gas stream.

Wet scrubber systems typically do not work as well as other VOC control technology in controlling volatile organic compounds with high molecular weights, and furthermore, do not work as well for high volume, low concentration waste gas streams. The waste gas streams for Chaparral Boats would be as high as 274,000 acfm (see Attachment F, Table F-10 of the facility's PSD submittal). The use of wet scrubbing technology is not known to be applied in surface coating facilities for the control of VOC emissions. Based on our comprehensive review of all known existing surface coating facilities in Georgia as well as our review of sources identified in the RACT/BACT/LAER data base, there is no indication that wet scrubbers are effectively utilized for controlling VOC emissions. This is due to the relatively high air flows and low concentrations at most surface coating facilities. Wet scrubbers generally work best for controlling particulate matter emissions, SO_2 emissions, and VOC emissions from chemical plants where VOC emissions are very concentrated (in the 1,000 ppmv to 2,500 ppmv range).

The low VOC concentration and high volume of the facility's waste gas streams will render the use of a wet scrubbing system technically non-feasible. Therefore, the facility did not consider Option 2 any further in this VOC BACT evaluation. The Division agrees with the above assessment.

Option 3 – Condensation Systems

VOC emissions from manufacturing facilities can be reduced by chilling the gas streams. As the temperature of the gas stream is lowered, a certain portion of the VOC in the exhaust stream will be condensed and removed.

Condensation is not technically feasible for gas streams with low VOC concentrations. The manufacturing operations in Plant Nos. 1, 3, 4, 5, and 7 will have fairly low concentrations of VOC in the exhaust streams. According to an U.S. EPA report, it is impractical to remove VOC via condensation at a level below several thousand ppmv. Condensation is a technically infeasible option for high volume dilute VOC waste streams (similar to Chaparral Boats) that are below the 1,000 ppmv range.

Chaparral Boats' waste gas streams are well below 1000 ppm and usually in the 10 to 35 ppmv range (32.7 ppm for an estimated flow rate of 72,000 acfm per Attachment F, Figure F-1 of the facility's PSD Application No. 16624). Based on these findings, the facility did not consider Option 3 any further in this VOC BACT evaluation. The Division agrees with the above assessment.

Option 4 – Closed Molding Systems

The closed molding process in fiberglass boat manufacturing involves the use of pressure to distribute the resin through the reinforcing fabric placed between two mold surfaces to either saturate the fabric or fill the mold cavity. The required pressure can be achieved by clamping, fluid pressure (e.g. water), atmospheric pressure, or vacuum pressure. Additionally, the mold surfaces can be flexible or rigid. Some examples of closed molding are infusion molding, resin injection molding (RIM), vacuum assisted resin transfer molding (VARTM), resin transfer molding (RTM), vacuum-assisted compression molding, and virtual engineered composite (VEC) manufacturing.

In most of the closed molding processes, a dry fiber mat or pre-form is packed into a mold cavity which has the shape of the desired part. The mold is then closed and resin is injected under pressure into the mold where it impregnates the pre-form. After the fill cycle, the cure cycle begins, during which the mold is heated and the resin polymerizes to become rigid plastic. Most closed molding operations operate in the above manner with some process variations. For example, the VEC manufacturing system utilizes a proprietary floating mold supported by water pressure instead of atmospheric pressure.

The facility has determined that closed molding techniques are not feasible for their boat manufacturing operations based upon technical issues, economic issues, and proprietary technology issues. There are several technical issues concerning product quality and production flexibility. It is possible that the closed molding system would result in a much duller finish and cause the boat hulls to develop premature cracks in the gel coat. Additionally, the closed molding systems are intended for manufacturers of boats with fewer models and for boats under 24 feet. Chaparral produces boats of varying length even in the same model. For example, the SSi series of boat ranges in length from 18.25 feet (180 SSi) to 29.5 feet (285 SSi). Therefore, the facility would still need an open molding production line to manufacture the larger boats in the SSi line.

Additionally, the cost of the closed molding production equipment is prohibitively expensive. New equipment would have to be purchased to make hulls and decks. Robots would also have to be purchased to cut fiberglass and manufacture plugs and molds. All of the equipment is computerized with software usually originating from the closed molding process manufacturer, which would add to the capital cost associated with closed molding systems. Finally, workers would have to be retrained in utilizing the closed molding process resulting in loss production and efficiency. The facility has not performed a full economic analysis at this time for the cost associated with the implementation of closed molding systems since closed molding is considered infeasible on a technical basis.

All of the closed molding processes utilize proprietary technology and have expensive licensing fees associated with them. For example, the VEC manufacturing technology is owned by Genmar (patent on the Floating Mold™ process), one of Chaparral's competitors, and use of the VEC technology would allow them a confidential view of Chaparral's open molding manufacturing techniques. In addition, several closed molding systems (such as VEC) require the use of specialized gel coats limiting the manufacturing flexibility of the facility.

Lastly, the facility has determined that closed molding should be considered a separate production process versus open molding (i.e. a different source category), therefore, the level of VOC control for closed molding should not be considered when performing a BACT evaluation for an open molding process. This notion is supported by USEPA in the preamble to the proposed Boat Manufacturing NESHAP Subpart VVVV (Section IV.E, FR page 43850, July 14, 2000) and in the preamble to the final Boat Manufacturing NEHAP Subpart VVVV (Section V.C, FR page 44226, August 22, 2001). In the November 10, 1988, PSD appeal concerning the Pennsauken County, New Jersey Recovery Facility (Appeal No. 88-8) it was concluded that BACT may require available methods, systems, and techniques to control emissions, however, the top down BACT determination is not intended to redefine the source.

Based on the above findings (technically infeasible and a different source category than open molding), Option 4 is not considered any further in this VOC BACT evaluation. The Division agrees with the above assessment concerning closed molding operations.

Option 5 – Bio-Filtration Systems

Bio-reactor is a generic term for a system that degrades contaminants with microorganisms. Bio-reactors are used primarily to treat volatile organic compounds (VOCs) and fuel hydrocarbons. This technology uses biological agents (microorganisms) or their products (enzymes) to degrade or reduce the hazardous nature of the organic materials that are captured in a moist environment. Organic materials are usually degraded to carbon dioxide and water, and various ions (hence the term mineralized). Unlike more conventional add-on controls, bio-reactors have to be more specifically tailored to the type of organic materials they are designed to destroy. There are several issues in using a bio-filter system to control waste gas exhaust from a fiberglass boat manufacturing facility.

Chaparral does not operate the spray booths and resin/lamination operations continuously, the plant manufactures boats only 8 hours per day, and there is no production on the weekends. As a result, the biological reactor would not receive a food source for 16 hours during the weekdays and for two days during the weekend resulting in the bioreactor organisms dying due to lack of VOCs for the organisms to consume. Bio-filters work best for manufacturing operations that run three shifts and have limited plant shutdown. Any sort of plant shutdown usually means that the organisms in the bioreactor portion of the filter have to be rejuvenated which is possible once per year but not possible two to three times per week.

When the gel coating and resin processes are operating, peaks and valleys in the styrene and MMA concentrations occur. Bio-filters do not operate effectively when the waste gas stream spikes to a high concentration (100 ppm) of styrene and then returns to a low styrene concentration (34 ppm). If so, the bio-filter organisms would acclimate to the low styrene concentration waste gas streams and would get conditioned to digesting a low styrene concentration. Any sudden spike in the styrene concentration would be a shock to the organisms and would likely result in decreased bio-filter VOC removal efficiency and the death of the organisms.

MMA, being one of the components of the waste gas streams, is not biodegradable, hence will only be partially degraded to a C4 compound (similar to partial oxidation or partial combustion). The presence of MMA could also have a negative effect on the health of the bio-reactor bed organisms and result in much lower VOC control efficiency for the bio-filter. It is important to note that it is technically infeasible to construct a capture system for a gel coat operation (like that performed at Chaparral Boats) that has an interfacial velocity of 100 feet/minute. As such, the quality of the gel coat application would be compromised by disruption the curing of the gel coat; therefore, overall quality of the boat produced would be greatly compromised. Any realistic control device would include emissions from the resin and gel coat operation (i.e. the entire manufacturing plant would be vented to end-of-pipe controls).

Chaparral's process situation is not the right application for the use of bio-filters as control technology since a bio-filter system needs to be continuously activated and cannot be turned on and off unlike and thermal oxidizer. The spike concentrations, and presence of MMA would result in the death of the organisms in the bed and/or a lack of efficiency as a control device. Because of these findings, Option 5 is not considered any further in this VOC BACT evaluation. The Division agrees with the above assessment.

Option 6 - Regenerative Thermal Oxidation (Equipment Cleaning and Material Mixing Operations)

The resin and gel coat mixing operations and equipment cleaning occur intermittently throughout Plant Nos. 1 through 5 and 7 and collectively represent less than 0.1 percent of the potential VOC emissions (less than 2 tpy). Therefore, the use of a regenerative thermal oxidizer (RTO) would not be technically feasible for these minor operations. Additionally, the equipment cleaning operations only use acetone and therefore, do not emit any VOC. The material mixing operation emissions are considered accounted for in the resin and gel coat operation emission calculations. There is no known boat manufacturing operation that utilizes a thermal oxidizer for the control of VOC emissions from material mixing operations and equipment cleaning. These operations typically occur throughout the plant and not in one location making capture of the VOC emissions from these operations technically infeasible. In past PSD preliminary determinations, the Division has determined that end-of-pipe controls for miscellaneous support and maintenance operations that occur plant-wide are not technically feasible (see PSD Preliminary Determination for Daimler Chrysler Mfg. – Savannah, May 2003). Option 5 is not considered any further in this VOC BACT evaluation for resin and gel coat mixing operations and equipment cleaning. However, the use of a RTO to control VOC emissions from gel coat operations, resin and lamination operations, adhesive operations, and mold cleaning operations (Option 7) is technically feasible and is further evaluated in Step 4. For the purposes of this BACT analysis, the facility accounted for the VOC emissions from the adhesive and mold cleaning operation's in the lamination operations.

Option 7 – Regenerative Catalytic Oxidation (Equipment Cleaning and Material Mixing Operations)

The resin and gel coat mixing operations and equipment cleaning operations will occur intermittently throughout Plant Nos. 1 through 5 and 7 and collectively represent less than 0.1 percent of the potential VOC emissions (less than 2 tpy). Therefore, the use of a regenerative catalytic oxidizer (RCO) would not be technically feasible for these minor operations. Additionally, the equipment cleaning operations only use acetone and do not emit any VOC. The material mixing operation emissions are considered accounted for in the resin and gel coat operation emission calculations. There is no known boat manufacturing operation that utilizes a catalytic oxidizer for the control of VOC emissions from material mixing operations and equipment cleaning. These operations typically occur throughout the plant and not in one location making capture of the VOC emissions from these operations technically infeasible. In past PSD preliminary determinations, The Division has previously determined that end-of-pipe controls for miscellaneous support and maintenance operations that occur plant-wide are not technically feasible (see PSD Preliminary Determination for Daimler Chrysler Mfg. – Savannah, May 2003). Option 6 is not considered any further in this VOC BACT evaluation for resin and gel coat mixing operations and equipment cleaning operations. However, the use of a RCO to control VOC emissions from gel coat, resin and lamination operations, and adhesive operations (Option 8) is technically feasible and was further evaluated in Step 4. For the purposes of this BACT analysis, the facility accounted for the adhesive and mold cleaning operation's VOC emissions in the lamination operations.

Step 3: Ranking the Remaining Control Technologies by Control Effectiveness

Table 6: Ranking of Control Technology

Control Technology Ranking	Control Technology	Control Efficiency[1]
1	Regenerative Thermal Oxidizer[2]	95 percent
2	Regenerative Catalytic Oxidizer[2]	90 percent
3	Pollution Prevention	N/A

[1]Pollution Prevention is considered compliance with NESHAP Subpart VVVV. This control option is considered the base case control option; therefore, control efficiency was not calculated.

[2]Only includes the control of the resin and gel coat operations (also includes the mold cleaning, adhesive operations, and Plant No. 3 Wood Coating Operation)

Step 4: Evaluating the Most Effective Controls and Documentation

The control technology evaluations for the Resin/Lamination Operations and Gel Coat Operations are combined for Options 7, 8, and 9. Detailed economic analysis for each control option is provided in Attachment F, Tables F-1 through F-36, of the facility's PSD application. The Division has reviewed each economic analysis and the calculations for each control option.

Option 8 – Regenerative Thermal Oxidation (Resin and Gel Coat Operations)

VOC can be oxidized to carbon dioxide and water vapor at high temperatures (generally 300 degrees Fahrenheit above the auto ignition temperature of the VOC with a residence time of 0.5 to 1.0 second). Thermal oxidizers can be recuperative or regenerative. Recuperative thermal oxidizers do not have a high heat recovery rate. Therefore, cost effectiveness is diminished. A regenerative thermal oxidizer (RTO) can achieve a much higher heat recovery. The RTO usually consists of two chambers packed with stone media. The waste gas enters the first stone bed where the gas is heated to a desired combustion temperature (only minimal amount of fuel is needed at this point). The waste gas stream then enters the second stone bed where heat is released from combustion and is recovered and stored in the bed. The beds alternate so the waste gas enters the second bed first in order to heat up to the desired combustion temperature. The system operates on an alternating cycle and recovers up to 90 percent of the thermal energy during oxidation. The use of an RTO has been found to be technically feasible. The control efficiency of an RTO is about 95 percent. Rotor concentrator systems were also evaluated in order to determine if they would allow VOC control utilizing a RTO to be considered cost effective.

The costs per ton of VOC reduced are provided in Attachment F for each emissions unit. Table 7 details the cost effectiveness of control Option 7 for the resin and gel coat operations. Due to the prohibitively high cost effectiveness of control Option 7, the use of a RTO will not be considered BACT for the resin and gel coat operations at the facility for reasons of economic infeasibility.

Option 9 – Regenerative Catalytic Oxidizers (Resin and Gel Coat Operations)

A regenerative catalytic oxidizer (RCO) is similar to a RTO but utilizes a catalyst bed to lower the energy required to achieve oxidation. As a result, less auxiliary fuel is required than a RTO. The control efficiency can be as high as 95 percent and tends to be slightly lower on average than a RTO (a RCO usually has a VOC destruction efficiency of approximately 90 %). A catalytic oxidizer will have higher operational costs due to catalyst replacement especially for high volume dilute waste gas streams. The economic analysis performed for the RCO demonstrates a much lower cost effectiveness (much higher ratio of dollars spent per ton VOC reduced) than that of a regenerative thermal oxidizer. Rotor concentrator systems were also evaluated in order to determine if they would allow VOC control utilizing a RCO to be considered cost effective.

The cost per ton of VOC reduced for each emissions unit is provided in Attachment F. Table 7 details the cost effectiveness of control Option 8 for the resin and gel coat operations. Due to the prohibitively high cost effectiveness of control Option 8, the use of a RCO will not be considered BACT for the resin and gel coat operations at the facility.

Table 9: BACT Cost Analysis

Plant No.	Emission Unit ID No.	Control Device	Cost/ton	PTE VOC (Tpy)	Emissions Red. (tpy)
1	P1DB	RTO	$31,783	130	123
1	P1DB	Catalytic Oxidizer	$30,191	130	117
1	P1HB	RTO	$32,402	130	123
1	P1HB	Catalytic Oxidizer	$30,797	130	117
1	P1LA	RTO	$38,142	307	292
1	P1LA	Catalytic Oxidizer	$36,272	307	276
2	P2AO	RTO	$153,822	56	53
2	P2AO	Catalytic Oxidizer	$145,264	56	51
3	P3GC, P3LA	RTO	$49,404	489	464
3	P3GC, P3LA	Catalytic Oxidizer	$48,262	489	440
3	P3WC	RTO	$117,977	13	12
3	P3WC	Catalytic Oxidizer	$110,678	13	12
4	P4GB	RTO	$37,113	111	105
4	P4GB	Catalytic Oxidizer	$36,188	111	100
4	P4G2	RTO	$96,008	28	26
4	P4G2	Catalytic Oxidizer	$91,231	28	25
4	P4LA	RTO	$42,002	148	140
4	P4LA	Catalytic Oxidizer	$39,733	148	133
R&D	RDML	RTO	$112,135	34	32
R&D	RDML	Catalytic Oxidizer	$106,578	34	30
5	P5DB	RTO	$24,459	165	159
5	P5DB	Catalytic Oxidizer	$23,642	165	148
5	P5HB	RTO	$26,763	168	159
5	P5HB	Catalytic Oxidizer	$25,583	168	151
5	P5LA	RTO	$23,407	344	327
5	P4LA	Catalytic Oxidizer	$22,383	344	310
5	P5DB,P5HB,P5LA	RTO with rotor conc system	$15,431	639	576
5	P5DB,P5HB,P5LA	Cat with rotor conc system	$15,579	639	546
5	P5DB	RTO with rotor conc system	$16,570	168	151
5	P5DB	Cat with rotor conc system	$17,285	165	140
5	P5DB, P5HB	RTO with rotor conc system	$14,272	335	303
5	P5DB, P5HB	Cat with rotor conc system	$14,509	335	287
7	P7DG	RTO	$40,379	130	123
7	P7DG	Catalytic Oxidizer	$38,206	130	117
7	P7HG	RTO	$511,798	130	123
7	P7HG	Catalytic Oxidizer	$38,206	130	117
7	P7LA	RTO	$29,467	296	280
7	P7LA	Catalytic Oxidizer	$27,764	296	266

Review of Facilities Using End-of-Pipe Controls

Through research of the RACT, BACT, LAER Clearinghouse (RBLC) website and the California Air Resources Board (CARB) website, which indicated that there are two facilities in the country, Bombardier Motor Corporation (Benton, Illinois) and Navigator Yachts (Perris, California), which use thermal oxidizers to control VOC emissions. End-of-pipe controls can be used only when the waste gas streams have a low volume, and high concentration. This is only achieved by the manufacturers of smaller boats (below 20 feet) or the manufacturers of larger custom, hand-made yachts. The two determinations from Illinois and SCAQMD are deemed not representative of the type of operations that occur at Chaparral's manufacturing plants. Bombardier manufactures personal watercraft and small jet boats, which have smaller hulls and are laminated using robotics conducted inside a booth to minimize airflow volume. Navigator Yachts manufactures multi-million dollar yachts by hand lay-up, making only a few boats per year. In direct contrast, to these two facilities, Chaparral Boats manufactures larger boats (up to 37 feet in length) on large molds requiring an open production area, and manufactures several thousand boats per year requiring mass-production techniques. Therefore, the Division agrees with the facility assertion that these two BACT determinations should not be considered in determining BACT for the facility's resin and gel coat operations.

Option 10 – Pollution Prevention

This control technology involves the reduction of VOC emissions via the use of lower VOC-containing raw material and high transfer efficiency application techniques such as fluid impingement technology (FIT). The facility can use gel coats and resins that have inherently low VOC contents with the use of non-atomized application techniques to achieve reductions in VOC emissions. NESHAP Subpart VVVV "NESHAP for Boat Manufacturing" requires that the manufacturing operations located at major sources of HAPs use a combination of low HAP content gel coats and resins with high transfer efficiency application techniques. The two HAPs emitted from the gel coat and resin operations at fiberglass boat manufacturing plants are styrene and methyl methacrylate, which are both VOC. The VOC content of the gel coat and resins will be equivalent to the combined HAP content. Therefore, the Division has determined that pollution prevention represents BACT for Plant Nos. 1, 3, 4, 5, and 7 resin and gel coat operations.

BACT for open molding resin and gel coat operations is the use of gel coats and resin with inherently low VOC contents. The VOC content of the resin and gel coat varies depending on the application technique used. The proposed BACT limitations are based upon the emission limitations specified in 40 CFR 63.5698, which are mirrored by BACT determinations listed on the RBLC. The BACT limitations were created by replacing the term HAP for VOC since the HAP content is equivalent to the VOC content for all resins and gel coats. Similar to what is allowed in NESHAP Subpart VVVV, the BACT determination allows the facility to demonstrate compliance with the VOC emissions limitation using two different methods. One method is the use of compliant resin and gel coats and the other method is the emissions averaging option which allows the facility to determine a VOC limit (based upon the amount of each type of resin or gel coat used and the application method) and compare it to the VOC emissions as calculated by the formula specified in the BACT limit [formula is based upon the formula found in 40 CFR 63.5710(b)]. The source is in compliance if the 12-month rolling total VOC emissions for each month are below the calculated VOC limit.

The specifics of this BACT determination proposal are described below in detail.

Open Molding Resin and Gel Coat Operations

The facility must limit the emissions of VOC from open molding resin and gel coat operations at the facility to below the following VOC limit which is the total allowable VOC (in kilograms) that can be emitted from the open molding operations.

$$\text{VOC Limit} = 46M_R + 159M_{PG} = 291M_{CG} + 54M_{TR} + 241M_{TG}$$

Where,

M_R = mass of production resin used (in megagrams) in the past 12 months, excluding any exempt materials

M_{PG} = mass of pigmented gel coat used (in megagrams) in the past 12 months, excluding any exempt materials

M_{CG} = mass of clear gel coat used (in megagrams) in the past 12 months, excluding any exempt materials

M_{TR} = mass of tooling resin used (in megagrams) in the past 12 months, excluding any exempt materials

M_{TG} = mass of tooling gel coat used (in megagrams) in the past 12 months, excluding any exempt materials

As described above, the facility will have two options of complying with this emission limit; the use of compliant materials and the use of an emissions averaging method. Under the emissions averaging provisions, the facility determines the 12-month rolling total VOC emissions each month per the following formula:

$$\text{VOC Emissions} = PVR_{MR} + PV_{PG}M_{PG} + PV_{CG}M_{CG} + PV_{TR}M_{TR} + PV_{TG}M_{TG}$$

Where,

VOC Emissions = Organic VOC emission calculated using BACT model point values for each operation included in the average (in kilograms).

PV_R = Weighted-average BACT model point value for production resin used in the past 12 months (in kilograms per megagram).

M_R = Mass of production resin used in the past 12 months (in megagrams).

PV_{PG} = Weighted-average BACT model point value for pigmented gel coat used in the past 12 months (in kilograms per megagram).

M_{PG} = Mass of pigmented gel coat used in the past 12 months (in megagrams).

PV_{CG} = Weighted-average BACT model point value for clear gel coat used in the past 12 months (in kilograms per megagram).

M_{CG} = Mass of clear gel coat used in the past 12 months (in megagrams).

PV_{TR} = Weighted-average BACT model point valued for tooling resin used in the past 12 months (in kilograms per megagram).

M_{TR} = Mass of tooling resin used in the past 12 months (in megagrams).

PV_{TG} = Weighted-average BACT model point value for tooling gel coat used in the past 12 months (in kilograms per megagram).

M_{TG} = Mass of tooling gel coat used in the past 12 months (in megagrams).

The BACT model point values are determined using the following table:

Table 8-1

Operation Type[1]	**Application Method** [1]	**Formula to calculate PV_i for each resin and gel coat** [1]
Production resin, tooling resin	a. Atomized b. Nonatomized	$0.014 \times (\text{Resin VOC\%})^{2.425}$ $0.014 \times (\text{Resin VOC\%})^{2.275}$
Pigmented gel coat, clear gel coat, tooling gel coat	All methods	$0.445 \times (\text{Gel coat VOC\%})^{1.675}$

1 per 40 CFR 63 Subpart VVVV, Table 3

The facility can also demonstrate compliance if the average VOC content of each and every gel coat or resin in their respective resin or gel coat category is below the limit specified in the following table:

Table 8-2

Operational Category[1]	Application Method[1]	The weighted-average organic VOC content must not be exceeded[1]
1. Production resin operations…..	Atomized (spray)	28 percent.
2. Production resin operations…..	Nonatomized (nonspray)	35 percent.
3. Pigmented gel coat operations	Any method	33 percent.
4. Clear gel coat operations……	Any method	48 percent.
5. Tooling resin operations……	Atomized (spray)	30 percent.
6. Tooling resin operations……	Nonatomized (nonspray)	39 percent.
7. Tooling gel coat operations…	Any method	40 percent.

1 as per 40 CFR 63 Subpart VVVV, Table 2

The VOC content for each category is determined each month on a 12-month rolling total basis. In addition, several types of production resins and gel coats in open molding operations are exempt from the above emission limitations due to the nature of their use at the facility. These exemptions are specified in the draft PSD permit amendment as Condition Nos. 3.3.17 and 3.3.23 and are based upon the exemptions for open molding operations as specified in 40 CFR 63.5698(d). These exemptions include resins that must meet Coast Guard specifications, low use gel coats provided that the percent by weight of the exempt gel coats does not exceed 1 percent of the total gel coat used (based on a 12-month rolling total), and 100 percent vinlyester resin used for skin coats. These materials cannot comply with the proposed limits due to their specialized nature. These exemptions are also specified in the Boat Manufacturing NESHAP (Subpart VVVV) and were included in the final NESHAP because the exempt resins and gel coats must conform to certain specified standards (i.e. safety standards of U.S. Coast Guard or back-up gel coats) that are greater than the NESHAP limits. It is reasonable to include these exemptions in the BACT determination since there are no known controls for these types of materials and the Boat Manufacturing NESHAP is the basis for BACT for open molding operations.

Resin and Gel Coat Mixing Operations

This BACT determination will also require the facility to implement work practice standards for the Plant Nos. 1, 3, 4, 5, and 7 resin and gel coat mixing operations. The BACT determination will require monthly inspections of all containers for resins and gel coats to ensure that lids are closed except for the removal or addition of material.

Equipment Cleaning Operations

The BACT determination for equipment cleaning operations in Plant Nos. 1, 3, 4, 5, and 7 is compliance with work practices requirements and the limiting of the VOC content of the cleaning solvent to no more than 5 percent VOC, by weight. This sets a de minimis limit of VOC that can be found in the equipment cleaning solvent. The facility will use acetone to comply with this BACT limitation. The BACT determination will also require the facility to store VOC-containing cleaning solvents in closed containers.

Adhesive Operations

The BACT determination for the adhesive operations in Plant Nos. 1, 2, 3, 4, 5, and 7 is the use of adhesives that contain no more than 50 percent VOC, by weight. This limit is derived from the HAP limitation in NESHAP Subpart VVVV of 5 percent, by weight. Sources that use an adhesive with a HAP content of no more than 5 percent had a corresponding VOC content of no greater than 50 percent.

Mold Cleaning

The BACT determination for the Plant No. 1, 3, 4, 5, and 7 mold cleaning operations is no controls. These operations are not regulated under any standard and result in very minimal emissions. In addition, when developing the Boat Manufacturing NESHAP USEPA stated that a MACT floor could not be developed for these operations due to limited information (see Section IV.H. of preamble to the proposed Boat NESHAP). The mold cleaning operations generally involve the stripping of cured resins and gel coats, which require solvents that are generally 100 percent VOC. It would be technically impossible to find any substitution for these materials.

Wood Coating Operations

The BACT determination for the Plant No. 3 Wood Coating Operation is no controls. The operations in Plant No. 3 are not regulated under any standard and result in 12.8 potential tons per year of VOC emissions. In addition, when developing the Boat Manufacturing NESHAP, USEPA stated that a MACT floor could not be developed for these operations due to limited information (see Section IV.H. of preamble to the proposed Boat NESHAP) and minimal usage. The wood coating operations involve the application of lacquers and sealers to cabinets and other small wooden parts. The lacquers and sealers generally have a high VOC content (75 % for the lacquers). Since the application of these lacquers is so specialized and necessary to produce the desired product it would be technically impossible to find any substitution for these materials.

Step 5: Selection of BACT

The Division has deemed pollution prevention, equivalent to the standard established by 40 CFR 63, Subpart VVVV, as Best Available Control Technology. The Division has also deem BACT for the other operations at Plant Nos. 1, 2, 3, 4, 5, and 7 (cleaning operations, adhesive operations, and material mixing) as the use of love VOC-containing material and the adherence to workplace standards. This determination is based on and supported by the following paragraphs.

It was determined that add-on controls were not economically feasible; the most cost effective control option (using a rotary concentrator an RTO to control lamination operations P5DB, P5HB in Plant No. 5) is $14,272 per ton. It should also be noted that this cost per ton is skewed on the high side because it is based on potential emissions running three shifts per day. Chaparral does not intend or have the logistic capability to operate continuously.

Searches of the RBLC and SCAQMD reveal that pollution prevention is BACT for boat manufacturing operations that most closely match Chaparral. Typically, BACT has been determined to be 35% VOC resins and VOC –free cleaning solvent. No BACT/LAER determination requiring add-on controls was found for manufacturing of large boats on a mass production basis.

US EPA concluded, in proposing 40 CFR 63, Subpart VVVV, that add-on controls are not a truly viable control option for the typical boat manufacturing operation, as described in the following excerpt from FR date 7/14/00, page 46851, "We are aware of one facility using a thermal oxidizer to control HAP from resin and gel coat operations in the manufacture of small jet boats…. The experience of the jet boat facility with thermal oxidation suggests that thermal oxidation had not been effectively demonstrated as a control option for boat manufacturing. …Moreover, the facility with the thermal oxidizer uses restricted airflow to capture concentrated HAP near the surface of the molds. …The restricted airflow management as practiced at this facility would not be suitable for other facilities in the industry. All other facilities produce a variety of products and parts and must have the operational flexibility to change product mix over time. Restricted airflow management would not be feasible in operations where workers apply the resin and gel coat, and a range of different types of boats are produced".

US EPA, in 40 CFR 63, Subpart WWW implies, through the limited standards of large-parts manufacturing, that add-on controls are not considered part of the MACT Floor. Under 63.5805(d)(2)(i)-(ii), new open molding operations manufacturing large reinforced plastic composites parts are not required to use add-on controls like smaller parts manufacturing operations are required to do. It continues to define a large open molding part being one that can be enclosed in the smallest rectangular six-sided box in to which the total interior volume of the box exceeds 250 cubic feet, or any interior sides of the box exceed 50 square feet. A small hull produced at Chaparral measures 19 feet by 6 ft by 4 ft giving a cubic volume of 456 cubic feet. The basis for this determination is that small parts can be made in a booth, which can minimize airflow, while large parts cannot.

Inspection of the facility affirmed the large scale of the facility and the final products. The size of the boat hulls and some of the decks does not allow a booth(s) to be constructed to capture airflows in amounts that lead to good control efficiency with add-on control devices. Most of the production occurs around a stationary hull/deck. The equipment for the gel coats and resins is mobile and is transferred between the product parts. Due to the inability for quality production to occur in booths, any control equipment installed on the buildings would have to be equipped to handle large amounts of airflow with small concentrations of pollutants.

Conclusion – VOC Control

The Division has determined that Chaparral's proposal to use pollution prevention techniques to minimize the emissions of VOC constitutes BACT.

Table 9: BACT Summary for Plant Nos. 1, 2, 3, 4, 5, and 7 Operations

Process Operation	Emission Unit ID Nos.	BACT Limit
Production Resin/Lamination	P1LA, P3LA, P4LA, P5LA, and P7LA	Production resin limited ≤ 35 % VOC by weight using non-atomized spray techniques or compliance with emissions averaging limit
		Production resin limited ≤ 28 % VOC by weight using atomized spray techniques or compliance with emissions averaging limit
		Tooling Resin limited ≤ 39 % VOC by weight using non-atomized spray techniques or compliance with emissions averaging limit
		Tooling Resin limited ≤ 30 % VOC by weight using atomized spray techniques or compliance with emissions averaging limit
Gel Coat Operations	P1DB, P1HB, P3GC, P4GB, P4G2, P5DB, P5HB, P7HG, and P7DG	Pigmented Gel coat limited ≤ 33 % VOC by weight or compliance with emissions averaging limit
		Clear Coat Gel coat limited ≤ 48 % VOC by weight or compliance with emissions averaging limit
		Tooling Gel coat limited ≤ 40 % VOC by weight or compliance with emissions averaging limit
R&D Mold Laminating	RDML	Production resin limited ≤ 35 % VOC by weight using non-atomized spray techniques or compliance with emissions averaging limit
		Production resin limited ≤ 28 % VOC by weight using atomized spray techniques or compliance with emissions averaging limit
		Tooling Resin limited ≤ 39 % VOC by weight using non-atomized spray techniques or compliance with emissions averaging limit
		Tooling Resin limited ≤ 30 % VOC by weight using atomized spray techniques or compliance with emissions averaging limit
Adhesive Operations	P1AO, P2AO, P3AO, P4AO, P5AO, and P7AO	Adhesives limited ≤ 50 % VOC by weight
Equipment Cleaning	P1EC, P3EC, P4EC, P5EC, and P7EC	Cleaning solvent limited ≤ 5 % VOC by weight (except for removing cured resin or gel coat) and VOC-containing solvents must be kept in closed containers.
Material Mixing Operations (Resin and gel coat)	P1MX, P3MX, P4MX, P5MX, and P7MX	The use of closed containers for the mixing of resins and gel coats.
Mold Cleaning Operations	P1MC, P3MC, P4MC, P5MC, and P7MC	No controls.
Plant No. 3 Wood Coating Operation	P3WC	No controls.

Summary – VOC Control Technology Review for the Removal of All Previous PSD Avoidance Limits

To fulfill the PSD permitting requirements for VOC, a BACT analysis was conducted for the removal of all previous PSD avoidance limits. The BACT selection for the removal of all previous PSD avoidance limits is summarized below in Table 4-9.

Table 10: BACT Summary for the Proposed Removal of All Previous PSD Avoidance Limits

Pollutant	Control Technology	Proposed BACT Limit
VOC	Pollution Prevention	See Table 10 Above

5.0 TESTING AND MONITORING REQUIREMENTS

Testing Requirements:

The facility will not be required to undergo any performance testing to demonstrate compliance with the proposed BACT. The proposed BACT is pollution prevention, which does not require a control device, and thereby, does not require a performance test.

Monitoring Requirements:

The facility will monitor the material safety data sheets (MSDS) and/or the certified product data sheets (CPDS) in order to demonstrate compliance with the BACT VOC emissions limitation and the other material VOC content limitations that are a part of this BACT determination. The facility will also be required to adhere to work practice standards via the use of monthly inspections. This record keeping and monthly inspections constitute periodic monitoring per 40 CFR 70.6(a)(3)(i)(B) and is sufficient to demonstrate compliance with the BACT permit limitations.

CAM Applicability:

Because no control devices are used to comply with emission limits, CAM is not applicable and is not being triggered by the proposed modification. Therefore, no CAM provisions are being incorporated into the facility's permit.

6.0 AMBIENT AIR QUALITY REVIEW

An air quality analysis is required of the ambient impacts associated with the construction and operation of the proposed modification. The main purpose of the air quality analysis is to demonstrate that potential emission increase due to the modification to remove all previous PSD avoidance limits for Plant Nos. 1 - 5, the construction and operation of Plant No. 7, and the construction and operation of a Wood Coating Operation in Plant No. 3, in conjunction with other applicable emissions from existing sources (including secondary emissions from growth associated with the new project), will not cause or contribute to a violation of any applicable National Ambient Air Quality Standard (NAAQS) or PSD increment in a Class II or Class I area. NAAQS exist for NO2, CO, PM10, SO2, Ozone (O3), and lead (Pb). PSD increments exist for SO2, NO2, and PM10.

Compliance with any NAAQS is based upon the total estimated air quality, which is the sum of the ambient estimates resulting from existing sources of air pollution (modeled source impacts plus measured background concentrations) and the modeled ambient impact caused by the applicant's proposed emission increase and associated growth. It is important to note that the air quality cannot deteriorate beyond the concentration allowed by the applicable NAAQS, even if not all of the PSD increment is consumed.

A separate air quality analysis is required for each of these pollutants emitted in a significant amount over the PSD significant threshold. As shown in Table 1, VOC is to be emitted in amounts over the PSD significant thresholds. However, Ozone is unique relative to other criteria pollutants (e.g CO, NO2, SO2, and PM) as the USEPA has not established a modeling protocol or significance level (e.g ppm or ug/m3) but has set a 100 tpy de minimis level as a trigger for an impact analysis. However, the photochemistry underlying the generation of ground-level ozone is complex and not always well defined. Consequently, USEPA has not established a dispersion model that is capable of accurately predicting ozone (VOC is a precursor to ozone) concentrations resulting from VOC emissions. Thus, it has been the Division's policy not to require PSD air dispersion modeling for VOCs. In lieu of this, an analysis of VOCs on ground level ozone concentrations has been assessed based upon existing ambient ozone monitoring data in relation to the relative increases of VOC emissions that have occurred from the major sources in the area. The Division has reviewed this analysis as part of the facility's PSD submittal and has determined that the modification to the facility will not cause a violation of the NAAQS for ground level ozone.

Air Toxics

There are no applicable NAAQS or specific Georgia ambient air standards for the individual toxics emitted by the facility. The toxics emitted by the removal of all previous PSD avoidance limits for Plant Nos. 1 - 5, the construction and operation of Plant No. 7, and the construction and operation of a Wood Coating Operation in Plant No. 3 include styrene, methyl methacrylate (MMA), toluene, ethyl acetate, xylenes, and 1-butanol. Impacts from each of the pollutants listed have been analyzed using the EPD Guidance for Ambient Impact Assessment of Toxic Air Pollutant Emissions (referred to as the Georgia Air Toxics Guideline; Version June 21, 1998). The Georgia Air Toxics Guideline is a guide for estimating the environmental impact of sources of toxic air pollutants. A toxic air pollutant is defined as any substance that may have an adverse effect on public health, excluding any specific substance that is covered by a State or Federal ambient air quality standard. The SCREEN3 or ISCST3 computer dispersion models are commonly used to conservatively predict the maximum 24-hour average or annual ground level concentration (referred to as MGLC) for each pollutant in question. The worst-case HAP and toxic emissions are used to perform the toxic guideline assessment. Each MGLC is compared to its respective acceptable ambient concentration (referred to as AAC). The basis for calculation of the AAC comes from the pollutant toxicity rating systems described in the Georgia Air Toxics Guideline.

The facility has performed a toxic impact assessment as specified in Attachment C of their PSD submittal. The Division has reviewed this impact assessment as well as attached data and has concluded that the facility passes the Georgia Toxic Guidelines for the modification of the removal of all previous PSD avoidance limits for Plant Nos. 1 - 5, the construction and operation of Plant No. 7, and the construction and operation of a Wood Coating Operation in Plant No. 3.

Toxic Pollutant	AAC (ug/m^3)	MGLC (ug/m^3)	MGLC/AAC Ratio	Pass/Fail
Styrene	1,000 (Annual)	366.35	0.37	Pass
MMA	700 (Annual)	45.26	0.07	Pass
Toluene	5,000 (Annual)	50.59	0.01	Pass
Ethyl Acetate	3,431 (24-hour)	138.20	0.04	Pass
Xylene	100 (Annual)	0.86	0.0009	Pass
1-Butanol	722 (24-hour)	4.41	0.012	Pass

Class I Visibility Analysis

The nearest PSD Class I areas are the Okefenokee Wilderness area, which is approximately 85 km to the southeast of the facility, and Wolf Island, which is 180 km east of the facility. The facility is not undergoing a PSD review for NOx, SO2, and PM, therefore, a Class I area significant impact assessment is not required.

7.0 ADDITIONAL IMPACT ANALYSES

PSD requires an analysis of impairment to visibility, soils, and vegetation that will occur as a result of the emissions from the removal of all previous PSD avoidance limits for Plant Nos. 1 - 5, the construction and operation of Plant No. 7, and the construction and operation of a Wood Coating Operation in Plant No.3) and an analysis of the air quality impact projected for the area as a result of general commercial, residential, industrial, and other growth associated with this project. Other impact analysis requirements may also be imposed on a permit applicant under local, State or Federal laws, which are outside the PSD permitting process (such as Georgia's Toxic Guidelines).

Visibility

Visibility impairment is any perceptible change in visibility (visual range, contrast, atmospheric color, etc.) from that which would have existed under natural conditions. Poor visibility is caused when fine solid or liquid particles, usually in the form of nitrogen oxides or sulfur oxides, absorb or scatter light. This light scattering or absorption actually reduces the amount of light received from viewed objects and scatters ambient light in the line of sight. This scattered ambient light appears as haze.

Another form of visibility impairment in the form of plume blight occurs when particles and light-absorbing gases are confined to a single elevated haze layer or coherent plume. Plume blight, a white, gray, or brown plume clearly visible against a background sky or other dark object, usually can be traced to a single source such as a smoke stack.

Detailed Level I and Level II visibility screening analyses were not required to be conducted because the facility did not trigger a PSD review of NOx, SO2, and PM. No significant adverse impacts on visibility are expected to result from the removal of all previous PSD avoidance limits for Plant Nos. 1 - 5, the construction and operation of Plant No. 7, and the construction and operation of a Wood Coating Operation in Plant No. 3.

Soils and Vegetation

No sensitive soil types are known to exist within the area of the project. Moreover, the areas of maximum impact are generally cultivated or forested and demonstrate no obvious sensitivity to industrial air emissions.

Growth

The effects to ambient air quality due to growth associated with the modification to remove all previous PSD avoidance limits for Plant Nos. 1 - 5, the construction and operation of Plant No. 7, and the construction and operation of a Wood Coating Operation in Plant No. 3 are expected to be insignificant. Therefore, commercial, residential and industrial growth impact analysis is not warranted and was not performed.

8.0 EXPLANATION OF DRAFT PERMIT CONDITIONS

The permit requirements for this proposed facility are included in draft Permit Amendment No. 3732-019-0003-V-02-5.

Section 1.0: Facility Description

The facility is requesting the removal of the PSD avoidance limits for Plant Nos. 1, 2, 3, 4, and 5 operations. This permit amendment is also being issued for the construction and operation of a new boat manufacturing plant (Plant No. 7) at the existing fiberglass boat manufacturing facility. This permit amendment will also be issued for the construction and operation of Plant No. 3 Wood Coating Operation.

Section 2.0: Requirements Pertaining to the Entire Facility

No conditions in Section 2.0 are being added, deleted or modified as part of this permit action.

Section 3.0: Requirements for Emission Units

Table 3.1 was modified to include the processes for Plant 7 (P7DB, P7HB, P7LA, P7AO, P7MC, P7EC, P7MX), and the Wood Coating Line for Plant No. 3. The table was also modified to show 40 CFR 52.21, PSD applicability and the corresponding permit conditions.

Conditions 3.2.1, 3.3.2, 3.3.4, and 3.3.5 were deleted. All of these conditions stated PSD avoidance limits. Condition 3.3.3 had previously been deleted in Permit Amendment No. 3732-019-0003-V-02-3, a previous PSD review for Plant No. 3 only.

Conditions 3.3.15 through 3.3.20 were originally included in Permit Amendment No. 3732-019-0003-V-02-3; these conditions incorporated BACT from a PSD review for only Plant No. 3. These conditions have been modified to include the project reviewed in this PSD analysis and BACT determination. These conditions are now applicable to Plant Nos. 1, 2, 3, 4, 5, and 7. Since BACT was determined to be pollution prevention, the standards set by 40 CFR 63 Subpart VVVV “NESHAP for Boat Manufacturing,” state the BACT standards for the operations in these plants

Condition 3.3.21 adds a VOC limit for adhesives.

Condition 3.3.22 adds the required notification of startup for Plant No. 7 and the Wood Coating Operation in Plant No. 3.

Section 4.0: Requirements for Testing

No conditions in Section 4.0 are being added, deleted or modified as part of this permit action.

Section 5.0: Requirements for Monitoring

Conditions 5.2.1 and 5.2.7 were deleted and the contents incorporated into Condition 5.2.8, which now includes all air pollution control devices for Plant Nos. 1, 3, 4, 5, and 7.

Condition 5.2.2 was modified to include inspections of all cyclone and cyclone/baghouse dust control systems for Plant Nos. 1, 3, 4, 5, and 7.

Conditions 5.2.5, and 5.2.6 were included in previous permit amendments, and are applicable to this Amendment and therefore included.

Condition 5.3.1 was deleted and replaced with Condition 6.2.44.

Section 6.0: Other Recordkeeping and Reporting Requirements

Condition 6.1.7 has been modified to include all changes made in past amendments, including incorporating Condition 6.1.8. Any exceedances referencing any PSD avoidance limits have been deleted. Exceedances and excursions have been added regarding the new and modified conditions for this PSD review.

Condition 6.1.8 has been deleted and incorporated into the Modified Condition 6.1.7.

Conditions 6.2.2 through 6.2.5 were deleted since they stated recordkeeping and reporting requirement for VOC emissions relating to PSD avoidance limits which were removed in this amendment.

Conditions 6.2.28 through 6.2.37 relate to the recordkeeping and reporting requires of the BACT analysis that was performed for Plant No. 3 only. These conditions have been modified to include the project reviewed in this PSD analysis and BACT determination. These conditions are now applicable to Plant Nos. 1, 2, 3, 4, 5, and 7. Since BACT was determined to be pollution prevention, the standards set by 40 CFR 63 Subpart VVVV "NESHAP for Boat Manufacturing," state the BACT standards for the recordkeeping and reporting.

Conditions 6.2.38 through 6.2.41 have been deleted since they were recordkeeping and reporting requirements regarding PSD avoidance limits which this amendment removed.

Condition 6.2.43 has been added regarding the written notification of startup of Plant No. 7 and the Wood Coating Operation in Plant No. 3.

Condition 6.2.44 was modified to include the project reviewed in this PSD analysis and BACT determination. This condition is now applicable to the control devices in Plant Nos. 1, 2, 3, 4, 5, and 7. Since BACT was determined to be pollution prevention, the standards set by 40 CFR 63 Subpart VVVV "NESHAP for Boat Manufacturing," state the BACT standards for the recordkeeping and reporting.

Section 7.0: Other Specific Requirements

No conditions in Section 7.0 are being added, deleted or modified as part of this permit action

APPENDIX A

Draft Revised Title V Operating Permit Amendment
Chaparral Boats, Inc.
Nashville (Berrien County), Georgia

APPENDIX B

Chaparral Boats, Inc. PSD Permit Application and Supporting Data

Contents Include:

1. PSD Permit Application No. 16624, dated February 27, 2006
2. Additional Information Package Dated June 8, 2006

APPENDIX C

EPD'S PSD Dispersion Modeling and Air Toxics Assessment Review