Title V Air Construction Permit Application

Prepared for:

New Gatsby Spas, Inc.
4408 Airport Road
Plant City, Florida 33567-1112

Prepared by:

Grove Scientific & Engineering Company
6140 Edgewater Drive, Suite F
Orlando, Florida 32810-4810

June, 2000

Project # 323800

GROVE
SCIENTIFIC & ENGINEERING

AMERICA'S ENERGYMISER SPA™

June 15, 2000

Mr. Sterlin K. Woodard
Environmental Protection Department of Hillsborough County
1410 N. 21ST Street
Tampa, Florida 33605

RE: New Gatsby Spas, Inc.
Title V Construction Permit Application
Permit No. 0570468-005-AV

Dear Mr. Woodard:

Enclosed is the construction permit application for the above referenced facility. The application is submitted in ELSA format on diskette (four copies), with hard copies of signature pages, supplements and attachments.

The facility proposes to increase production of spas, and increase resin usage. However, control equipment is also proposed which will result in styrene and HAPS emissions meeting the current permit limits, while increased VOC emission limits are requested.

If you have any questions or comments, please contact me at the letterhead address, or contact Bruno Ferraro at Grove Scientific & Engineering Company at (407) 298-2282.

Sincerely,
New Gatsby Spas, Inc.

Kenneth W. Sorah
President/CEO

Cc: Ronald Schott, Edwards & Angell
John Kasper, Grove Scientific

4408 Airport Road • Plant City, FL 33567-1112
813.754.4122 • 1.800.393.7727 • FAX 813.752.5716

Department of
Environmental Protection

DIVISION OF AIR RESOURCES MANAGEMENT

APPLICATION FOR AIR PERMIT - LONG FORM

I. APPLICATION INFORMATION

Identification of Facility Addressed in This Application

1. Facility Owner/Company Name : NEW GATSBY SPAS, INC.	
2. Site Name : NEW GATSBY SPAS, INC.	
3. Facility Identification Number : 0570468	[ ] Unknown
4. Facility Location : PLANT CITY, FL Street Address or Other Locator : 4408 AIRPORT ROAD City : PLANT CITY	County : HILLSBOROUGH Zip Code : 33567-1112
5. Relocatable Facility? [ ] Yes [X] No	6. Existing Permitted Facility? [X] Yes [ ] No

RECEIVED
JUN 20 2000
EPC of HC
AIR MANAGEMENT

RECEIVED
JUN 22 2000
BUREAU OF AIR REGULATION

Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official :

Name : KENNETH W. SORAH
Title : PRESIDENT/CEO

2. Owner or Authorized Representative or Responsible Official Mailing Address :

Organization/Firm : NEW GATSBY SPAS, INC.
Street Address : 4408 AIRPORT ROAD
City : PLANT CITY
State : FL Zip Code : 33567-1112

3. Owner/Authorized Representative or Responsible Official Telephone Numbers :

Telephone : (813)754-4122 Fax : (813)752-5716

4. Owner/Authorized Representative or Responsible Official Statement :

I, the undersigned, am the owner or authorized representative of the non-Title V source addressed in this Application for Air Permit or the responsible official, as defined in Rule 62-210.200, F.A.C., of the Title V source addressed in this application, whichever is applicable. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions units.*

Signature

6/19/2000
Date

* Attach letter of authorization if not currently on file.

4. Professional Engineer Statement :

I, the undersigned, hereby certify, except as particularly noted herein, that :*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollutant control equipment described in this Application for Air Permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

If the purpose of this application is to obtain a Title V source air operation permit (check here [ ] if so), I further certify that each emissions unit described in this Application for Air Permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance schedule is submitted with this application.

If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [ ] if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

If the purpose of this application is to obtain an initial air operation permit or operation permit revision for one or more newly constructed or modified emissions units (check here [ ] if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

John D. Kayser — 6/16/00

Signature — Date

(seal)

Attachment A

Area Map Showing Facility Location

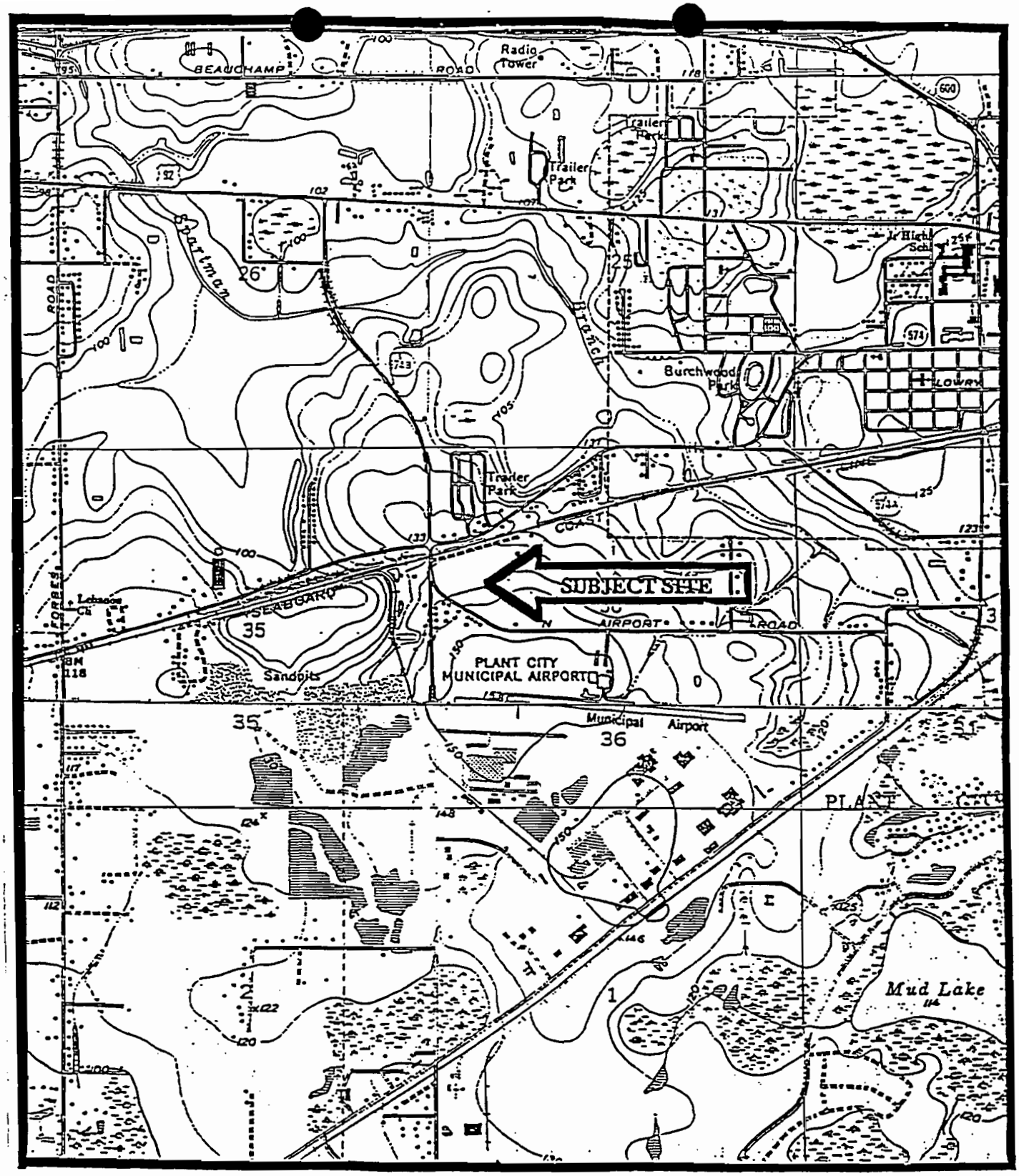
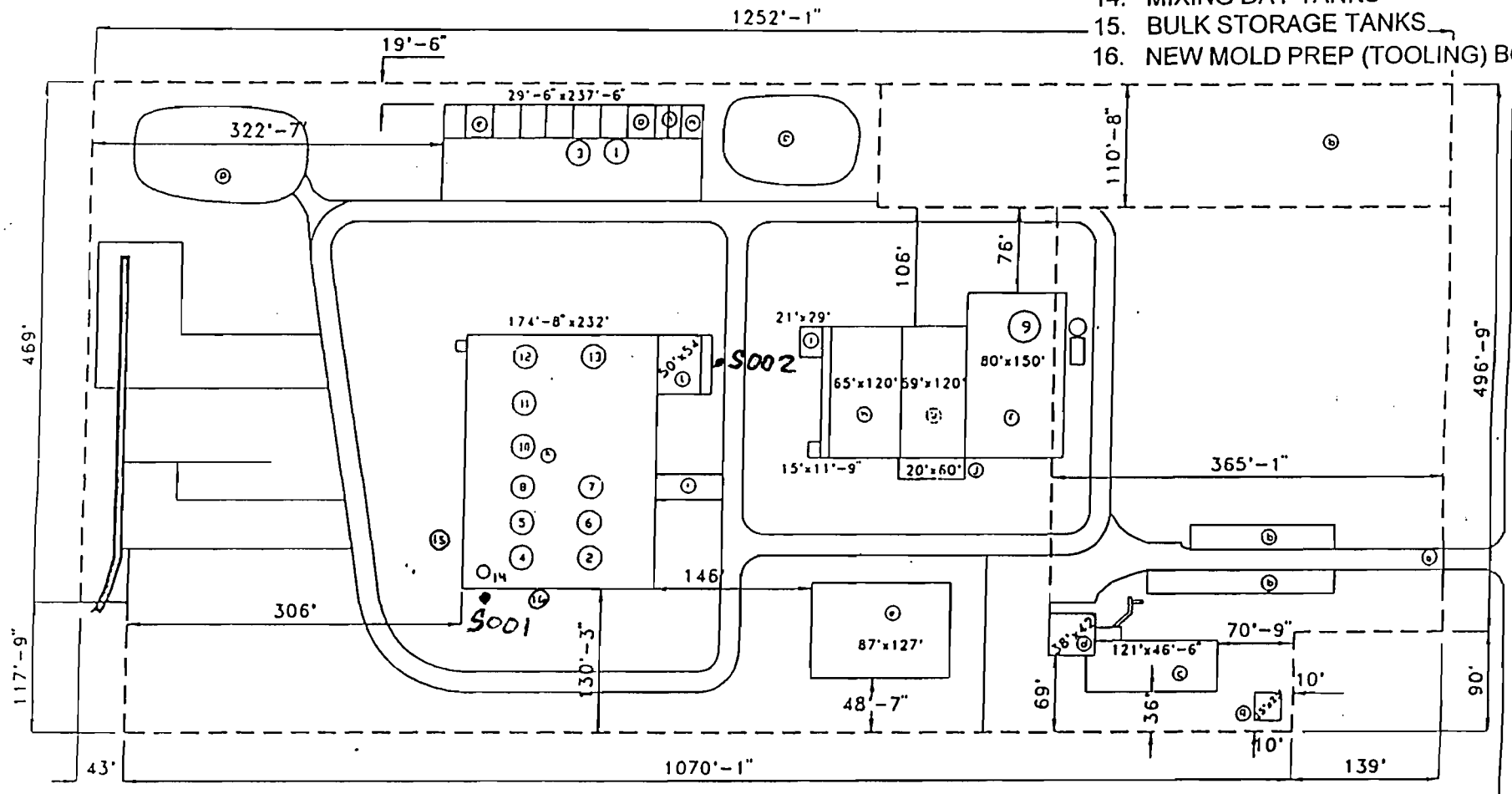


Figure A-1 USGS Topographic Quadrangle maps of Plant City West, Florida, dated 1975, and photorevised in 1983 and Dover, Florida, dated 1955, and photorevised in 1987.	Project Number [redacted]
	N ↑ Scale 1" = 2,000'

Attachment B

Facility Plot Plan

1. MOLD BUILDING
2. VACUUM FORMING
3. FILTER WELL LAYUP
4. FIBERGLASS
5. FOAM
6. CUT-OFF
DRILLING/PLUMBING
8. BOXING
9. WOOD
10. PACK INSTALLATION
11. WATER TEST
12. FINAL FINISH
13. PALLETS/BAGGING
14. MIXING DAY TANKS
15. BULK STORAGE TANKS
16. NEW MOLD PREP (TOOLING) BOOTH



a) MAIN ENTRANCE
b) PARKING
c) MAIN OFFICE
d) SHOW ROOM
e) SPA STORAGE
f) WOOD SHOP
g) WOOD AND MATERIAL STORAGE
h) MATERIAL STORAGE
i) LOADING DOCK
j) COMPRESSOR SHED
k) MAIN MANUFACTURING BUILDING
l) PLANT OFFICE
m) MAINTENANCE SHOP
n) FABRICATION SHOP
o) MOLD SHOP
p) RETENTION POND
q) PICNIC SHED

N

Gatsby

Figure B-1. Facility Plot Plan

Attachment C

Process Flow Diagram

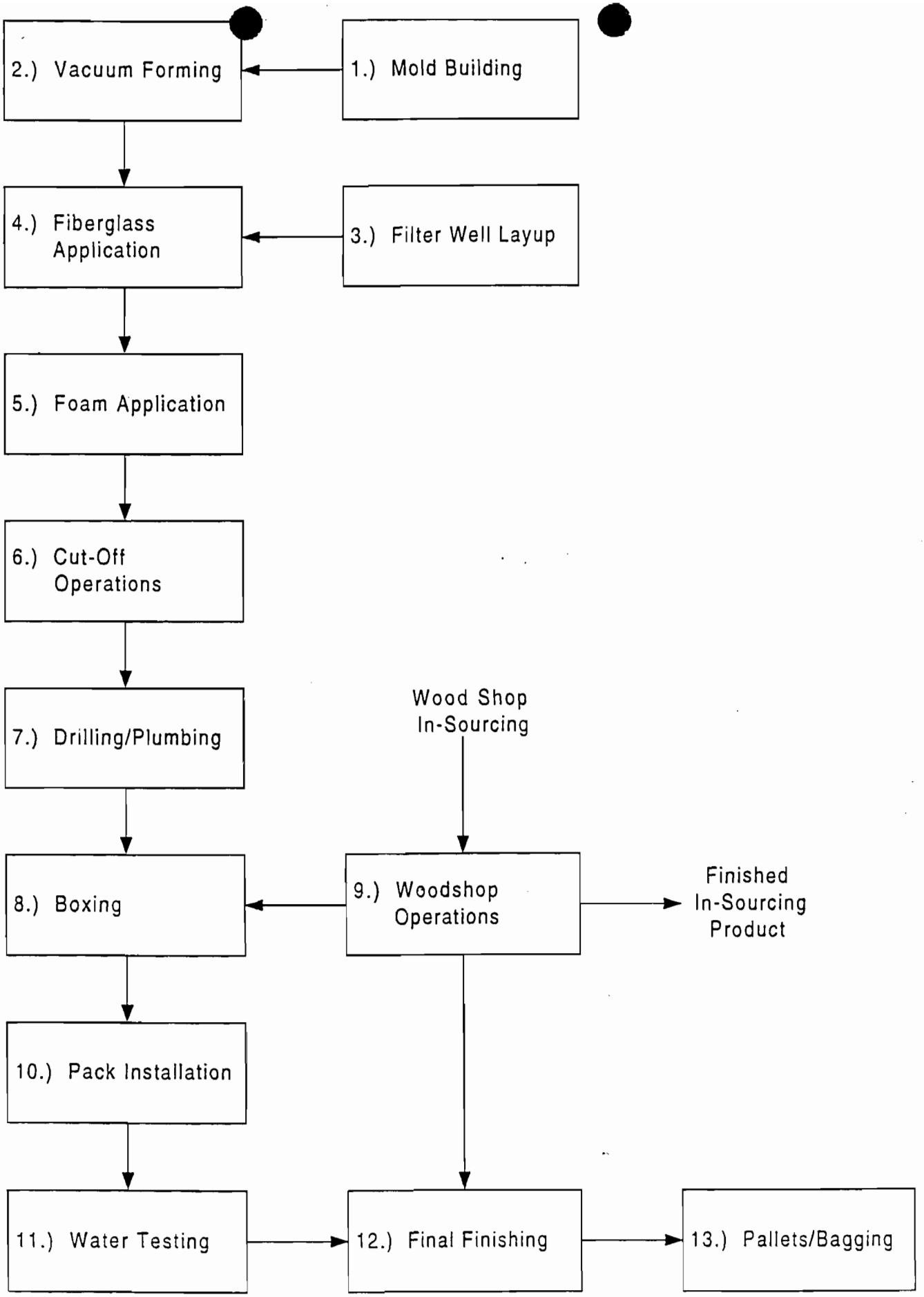


Figure C-1. Process Flow Diagram

Description of Processes

1. The vacuum molds for vacuum forming are made in this process.

2. An acrylic sheet is clamped on a mold and heated between 360°F and 385°F. Once the acrylic is at temperature, vacuum forming of the acrylic follows.

3. The filter well of the spa is hand laid with polyester resin and glass chop mat.

4. The application of fiberglass to the acrylic shell consists of a) cleaning the shell with styrene; b) applying one light coat of polyester resin; and c) applying one heavy coat of polyester resin. After step "b", a filter shell is fiberglassed to the spa shell and sealed in place with the heavy coat of resin (step "c"). The filter shells are made with polyester resin by the hand laid method.

5. On completion of fiberglassing work, each spa shell is coated with ½ inch of polyurethane foam.

6. The spa shells are trimmed of peripheral mold material and cut to their final shape on a rotary table.

7. The spa shells are drilled for plumbing. All plumbing consists of mounting ABS jets and PVC inserts to the shell. PVC hoses are glued to the jets and inserts with PVC cement.

8. A redwood collar frame is screwed to the plumbed spa shell. A structural pine wood frame is then screwed to the collar frame.

9. The redwood collar frame is constructed and stained with water born stain in the wood shop before the boxing assembly of the spas.

10. Framed spas receive electric/electronic components and are plumbed to completion.

11. Each spa is filled with water and checked for leaks and control performance.

12 Spas are cleaned, dried, and panelled. Final inspection of cosmetic defects may require polishing of the acrylic shell. A water born stain is used at the bottom of the wood frame.

Attachment D

Precautions to Prevent Emissions of Unconfined Particulate Matter

Precautions to Prevent Emissions of Unconfined Particulate Matter

All reasonable precautions, as described by 62-296.320(4) F. A. C., shall be taken to control unconfined particulate matter emissions from these sources. Roads, parking areas, and yards shall be paved, have dust suppressants applied to them, and/or have sources of particulate matter removed from them where applicable to minimize particulate matter emissions.

Attachment E

Fugitive Emissions Identification

Fugitive Emissions Identification

The following operations are sources of fugitive emissions:

1. Miscellaneous Cleanup Solvents - Small amounts of fugitive VOCs and HAPs are emitted from the use of miscellaneous materials used in the spa production process.

2. Storage Tanks - Small amounts of fugitive VOCs and HAPs are emitted from four (4) polyester resin mixing day tanks and three (3) resin storage tanks.

Emissions from these sources are included in EU001 of this permit application.

Attachment F

List of Proposed Insignificant Units

List of Proposed Insignificant Activities

1. Parts Washers - There are three (3) parts washers or degreasers that are serviced by properly licensed vendors. The degreasing liquid does not contain HAPs and the VOC emissions from this liquid are considered to be insignificant per 62-213.430(6)(b) F.A.C.
2. Silk Screening - The facility has a small silk screening operation to serve their packaging needs. The operation is very small and the chemicals used in this process are used in very small quantities (measured in quarts). The emissions from this source are considered insignificant per 62-213.420(6)(b) F.A.C.

SUPPLEMENT I

EMISSIONS CALCULATIONS

1.0 Introduction

New Gatsby Spas, Inc., (NGS) operates a spa manufacturing facility at 4408 Airport Road, Plant City, Hillsborough County, Florida. The facility operates under Title V Operating Permit 0570468-005-AV, effective 10/20/98 and expiring 4/20/03.

The primary activity at NGS is fiberglass reinforced spa production (SIC Code 3088). The principal processes involved in spa manufacturing at the facility include vacuum forming of acrylic spa shells, fiberglass resin and foam application, PVC plumbing, mold preparation (tooling), wood working, and additional activities and equipment necessary to support these activities.

1.1 Purpose for Permit Application

NGS proposes to increase production of spas. The resultant increase in material consumption will exceed the levels listed in the current permit. Therefore, NGS requests a Title V Construction Permit to increase the material usage limitations in the existing permit, and to make facility modifications required for the increased production. Potential emissions of VOC's and combustion related criteria pollutants are also projected to increase, however, potential emissions of HAPS and styrene are projected not to exceed the limits of the existing permit, due to the addition of proposed control equipment requested by this application. A summary of projected emissions is shown in Table 1. The facility proposes to operate without time restrictions, i.e., 8760 hour per year.

The hourly production rate of spas will remain essentially the same. Any increases in hourly spa production will be due to normal engineering or work practices to increase production efficiencies. The proposed increase in production will be achieved by increasing the hours of operation to 8760 hours/yr.

1.3 Proposed Facility Modifications

The following facility modifications are proposed as part of the expansion of production capacity:

1) Enclose the production line area and vent the exhaust to a thermal oxidizer for control of styrene and VOC emissions. The production areas to be enclosed are those in which acrylic sheet is cleaned and formed, those in which resin and foam are sprayed on the sheet, and those in which small covers are laid up manually. The planned thermal oxidizer will be a regenerative type and incorporate a means for heat recovery.
2) Change the existing atomizing resin sprayers in the production area to flow coaters to reduce styrene emissions.
3) Add storage tank capacity to the existing 8800 gallon tank, comprising two resin storage tanks of approximately 8800 gallons and 4500 gallons capacity, and four day tanks for storing mixed resin with a capacity of approximately 1300 gallons each. All storage tanks will have conservation vents to limit breathing losses.
4) Replace the existing cyclone, in the wood shop, with a bag house, for improved capture efficiency.
5) Add a small spray booth near the tooling area for use in making new molds.
6) Add another natural gas-fired, catalytic oven the same size (0.6MMBTU) as the existing oven.

A new building (approximately 29,000 sq.ft.) will be constructed on the north side of the production building. This new building will house the wood shop, staining operation and wood materials warehouse, as well as the bulk storage and day tanks. The cyclone will be replaced by the bag house after the new building is completed and the wood shop is relocated. Enclosing the storage tanks in the building will reduce breathing losses from these sources, but this effect was not considered in this conservative analysis.

1.4 Applicable Regulations

Applicable regulations remain unchanged from the previous Title V application.

2.0 Process Description and Calculation of Potential Emissions

Most of the spa production activities at NGS take place in the production building. Production operations in this building include the production line, comprising acrylic sheet forming and cleaning, resin spraying, foam spraying, and hand lay-up operations. PVC cementing of plumbing, and final finish cleaning, are also performed in the production building. Tooling for new molds is done in a nearby building, and a new spray booth will be located just outside the existing tooling area. The existing wood shop is in another building, in which woodcutting and staining is done. The wood shop is Emission Unit 002. All other activities are included in Emission Unit 001, using the format of the existing permit.

2.1 Emission Calculations for Emission Unit 001

The spa production line is located in the west half of the production building. It is proposed that this part of the production building be enclosed by erecting a permanent wall inside the building. The walls of the proposed enclosure will be sealed, and door, vent and window openings will be limited to obtain a capture efficiency of 85%. Fans will draw the exhaust from the enclosure and direct the exhaust to a regenerative thermal oxidizer. The destruction efficiency of the thermal oxidizer will be 95%. Detailed specifications for the oxidizer will be provided by NGS. Preliminary sizing data has been used in this analysis; however, the analysis is believed to be conservative. It is anticipated that the oxidizer will use burners rated at a total of 10 MMBTU/hr, based on a similar unit already in operation at another facility. It is anticipated that the oxidizer dwell time and temperature will be 1.0 second and 1500°F, respectively, but actual conditions will be set to achieve the desired destruction efficiency. The stack test performed for demonstrating compliance will be used to set operating conditions to obtain the desired destruction efficiency.

The spa production line begins by forming the shape of the spa interior, using an acrylic sheet. Acrylic sheets are molded in two vacuum presses heated by natural gas ovens rated at 0.6 MMBTU/hr each. The ovens are catalytic units, but, for this conservative analysis, emission

TABLE 1. FACILITY EMISSIONS SUMMARY

	POLLUTANT EMISSIONS, TPY													
OPERATION	**Styrene**	**MEK (II120)**	**Xylene (II186)**	**VA (II182)**	**HAPS**	**VOC**	**PM**	**PM10**	**NOX**	**CO**	**SO2**	**IICL**	**HF**	**MDI**
PRODUCTION LINE - Fugitives	37.5	0.026	0.005	0	37.5	37.5	0.02	0	0	0	0	0	0	0.02
THERMAL OXIDIZER	10.6	0.007	0.001	0	10.6	10.8	0.65	0.65	6.64	1.66	0.03	2.9	0.8	0.00
TOOLING	3.0	0.000	0	0.005	3.0	3.0	0	0	0	0	0	0	0	0
STORAGE TANKS	0.1	0	0	0	0.1	0.1	0	0	0	0	0	0	0	0
CLEANING	0	0	0	0	0.0	37.5	0	0	0	0	0	0	0	0
PVC CEMENT	0	4.50	0	0	4.5	9.9	0	0	0	0	0	0	0	0
WOOD SHOP	0	0	0	0	0	0	2.1	0	0	0	0	0	0	0
OVENS	0	0	0	0	0	0.03	0.04	0.04	0.57	0.48	0.00	0	0	0
STAIN/WOOD FINISH	0	0	0	0	0	3.8	0	0	0	0	0	0	0	0
POWDER MIXING	0	0	0	0	0	0	1.1	1.1	0	0	0	0	0	0
TOTALS	**51.3**	**4.53**	**0.01**	**0.01**	**55.8**	**102.7**	**3.9**	**1.8**	**7.2**	**2.1**	**0.0**	**2.9**	**0.8**	**0.02**

TABLE 2. EMISSIONS SUMMARY FOR EMISSIONS UNIT 001, FIBERGLASS SPRAYING

	POLLUTANT EMISSIONS, TPY													
OPERATION	Styrene	MEK (H120)	Xylene (H186)	VA (H182)	HAPS	VOC	PM	PM10	NOX	CO	SO2	HCL	HF	MDI
PRODUCTION LINE - Fugitives	37.5	0.026	0.005	0	37.5	37.5	0.02	0	0	0	0	0	0	0.02
THERMAL OXIDIZER	10.6	0.007	0.001	0	10.6	10.8	0.65	0.65	6.64	1.66	0.03	2.9	0.8	0.00
TOOLING	3.0	0.000	0	0.005	3.0	3.0	0	0	0	0	0	0	0	0
STORAGE TANKS	0.1	0	0	0	0.1	0.1	0	0	0	0	0	0	0	0
CLEANING	0	0	0	0	0.0	37.5	0	0	0	0	0	0	0	0
PVC CEMENT	0	4.50	0	0	4.5	9.9	0	0	0	0	0	0	0	0
OVENS	0	0	0	0	0	0.03	0.04	0.04	0.57	0.48	0.00	0	0	0
POWDER MIXING	0	0	0	0	0	0	1.1	1.1	0	0	0	0	0	0
TOTALS	**51.3**	**4.53**	**0.01**	**0.01**	**55.8**	**98.9**	**1.8**	**1.8**	**7.2**	**2.1**	**0.0**	**2.9**	**0.8**	**0.02**

factors from AP-42, for direct flame combustion of natural gas, were used. The potential natural gas consumption of the ovens, at the burner rating, is 10.6 MMCF/yr. A 96 kBtu/hr catalytic oven is used for making filter lids, and the gas consumption for this oven is 0.8 MMCF/yr at 8760 hr/yr. The total oven gas consumption for the three ovens is thus 11.4 MMCF/yr. The emissions of criteria combustion pollutants from the oven are shown in Table 2.

After the acrylic sheet is formed, it is cleaned with a hand wiping of styrene. Approximately 0.36 lb of styrene is used for each spa, and an emission factor of 100% is used for this operation. Emissions from the wiping operation will be captured in the enclosure and controlled in the thermal oxidizer.

Polyester resin is applied to the acrylic sheet in two coats. The facility will replace the existing resin atomizing spray equipment with flow coaters to reduce emission of styrene. Although vapor suppressed resin could possibly be used, more testing is required and no vapor suppression was assumed for this conservative analysis. All emission factors for resin application were taken from the Composite Fabricators Association (CFA) Table of EPA MACT Model Point Values, dated September 22, 1999.

The cleaned acrylic spa shell enters Spray Booth No. 1. Polyester resin with a maximum styrene content of 45% is used to apply the first coat of resin and chopped fiberglass. The spa leaves the spray booth, and the wet resin is hand worked to remove air bubbles in the resin/glass mixture. The filter well is attached at this point. The spa then enters Spray Booth No. 2. Polyester resin with a maximum styrene content of 45% is used to apply the second coat of resin and chopped fiberglass. The spa leaves the second spray booth, and the wet resin is again hand worked to remove air bubbles in the resin/glass mixture. An emission factor, of 162 lb styrene emitted per ton of resin consumed (lb/ton), was used to calculate styrene release. At least 85% of the potential styrene emission from the resin application operations will be captured in the enclosure and controlled in the thermal oxidizer. The remainder of the potential styrene emission from this operation (15% maximum) will be emitted as a fugitive. Resin consumption from these operations is projected to be 2800 TPY.

The spa then enters Spray Booth No. 3 where a polyurethane foam coating is applied and the edges are trimmed with a saw. Approximately 415 TPY of foam will be used, consisting of 219 TPY MDI and 196 TPY resin. One potential emission from the foam application operation is a volatile organic solvent (VOS, specifically CFC-141b) used as a blowing agent in the foam. (CFC-141b is not a volatile organic compound, or VOC, as listed in the current permit.) Another potential emission from the foam spraying operation is the HAP, MDI (H129).

CFC losses are typically not addressed in Title V applications, but here the losses are captured in the building and vented to a thermal oxidizer. Depending on the oxidizer operating conditions, some of the CFC will be converted to the acid gases HCl and HF, which are HAPS. For this conservative analysis, all of the CFC lost in the spraying process was considered converted to acid gases. Presently, no control is proposed for the acid gases. Most of the blowing agent remains in the foam, but some is lost when the foam is sprayed. The foam manufacturer, BASF, recommends a loss factor of 16% of available CFC for an open process, such as spraying the underside of a spa. The available CFC is listed as 15% of the resin content in the MSDS (see Attachment L). Total potential usage of CFC was calculated to be 29.5 TPY (see attachment K). CFC 141b is dichlorofluoroethane, C2Cl2FH3, which is 61% chlorine, and 16% fluorine, by weight. The potential HCl emission is then 2.9 TPY, and the potential HF emission is then 0.8 TPY, as shown in Table 1 and Table 2.

MDI emissions are released in the form of particulates, and are calculated based on information provided in "MDI Emissions Reporting Guideline", published in 1992 by the Society of the Plastics Industry, Inc. MDI emissions were calculated for the open process application method using the following equation.

$$W = 24.4(P_T M_T) u^{0.78} A/T,$$

Where:

W = Evaporation Rate, g/sec

P_T = Liquid Vapor Pressure, atm (1.283E-6 at 70°C, maximum temperature)

M_T = Average Molecular Weight (250 for MDI)

u = Airflow in m/sec (14.75 estimated maximum)

A = Exposed Area, square meters (15.36 square meters maximum)

T = Temperature, K (70°C, 343 K maximum temperature).

The estimated maximum values are based on worst case conditions of the largest spa, at the highest temperature occurring during the resin/MDI reaction temperature. Using these values, the evaporation rate W=0.003 g/sec or 0.104 TPY of MDI. Of this potential loss of MDI, 85% will be captured and 95% of the captured MDI will be thermally destroyed in the oxidizer. Actual potential emissions of MDI were thus calculated to be 0.02 TPY as show in Tables 1 and 2.

A small hand-lay-up operation also takes place near the production line. This operation produces a small part called a "filter well" for each spa. The resin used in this operation has a maximum styrene content of 45.5%, and an emission factor of 170 lb/ton was used to calculate potential styrene release. Resin consumption from this operation is projected to be 125 TPY. A small amount (50 gal/yr) of mold cleaner is also used in this area to clean the filter well molds. This cleaner contains 15% xylene and 85% VOC. At least 85% of the styrene, xylene and VOC losses from this operation will be captured in the enclosure and controlled, and the remainder of the emissions from this operation will be emitted as a fugitive.

Fugitive emissions from the production line operations, and stack emissions from the thermal oxidizer are shown in Table 2. The stack emissions from the thermal oxidizer consist of styrene that is not destroyed, and criteria pollutants from combustion of the natural gas and the styrene that is destroyed. The styrene emission was calculated based on 95% destruction of the captured styrene. The criteria pollutants from combustion were calculated by considering the styrene vapors to be combusted in a manner similar to natural gas. The natural gas equivalent of the styrene vapors was calculated by converting the heat content of the captured styrene vapors to an equivalent MMCF/year of natural gas, based on a styrene heat content of 18,000 BTU/lb and a natural gas heat content of 1000 BTU/CF. The equivalent natural gas content of the captured styrene was thus calculated to be 7.3 MMCF. The operation of the 10 MMBTU/hr oxidizer burners for 8760 hours, at 1000 BTU/CF, results in a projected natural gas consumption of 87.6 MMCF. The combined natural gas equivalent, for the captured styrene and the natural gas consumed by the burners, was calculated to be 94.9 MMCF. Criteria pollutants for this natural gas consumption were then calculated using AP-42 emission factors for natural gas combustion in industrial boilers of at least 10 MMBTU/hr rating, and the results are shown in Table 2. Note

that the calculated VOC emissions from the oxidizer include styrene emission as well as VOC's from natural gas combustion.

Emissions from tooling operations will not be controlled. Tooling is done in two operations. The first involves manual lay-up using a resin with a styrene content of 48%, resulting in an emission factor of 187 lb/ton. Resin consumption from this operation will be 7 TPY. A small amount of vinyl acetate is used in this resin, and the emission factor for styrene was applied to vinyl acetate, adjusted for the small (0.6%) concentration of vinyl acetate. Thus, emissions of vinyl acetate were calculated to be insignificant at less than 0.01 TPY. The other tooling operation will be performed in a new spray booth, using atomizing spray equipment. The resin consumption of this operation is 15 TPY, and the emission factor for the 47% styrene resin is 318 lb/ton. The resulting styrene emissions from both tooling operations are 3.0 TPY, as shown in Table 2.

Emissions from the use of PVC plumbing cement will not be controlled. The cement contains 40% MEK and a total of 88% VOC, and 15 TPY will be used. Not all of the cement evaporates during the solvent bonding process for PVC piping, because some of the glue is trapped in the joint. An emission factor of 75% was used based on knowledge of the process. Emissions of MEK and VOC's are summarized in Table 2.

Emissions from Final Finish cleaning operations will not be controlled, and an emission factor of 100% was used for all cleaning solvents. Most of the cleaning solvents used by NGS is isopropanol. Isopropanol usage is projected to be 37.5 TPY, and this is a VOC only. The emissions from cleaning operations are summarized in Table 2.

Styrene emissions from storage tanks and day mixing tanks were calculated using EPA's TANKS3 software. The tanks are all fixed-roof, vertical types with a white exterior (baseline) assumed. For this conservative analysis, the contents of all tanks were assumed to be 100% styrene. All three storage tanks have conservation vents, but the day mixing tanks do not. All tanks have agitators, which do not affect the emissions from the tanks. The two large storage tanks will hold the resin used in the resin spraying operations in the production building. The

tank throughputs were calculated considering the resin throughputs to be the same for both tanks. The small storage tank will hold the hand lay-up resin, which is used for making the filter well parts. This resin is currently bought in drums. Emissions from the tanks are summarized in Table 2. Summary emissions reports from TANKS3 are shown in Attachment J.

Calcium sulfate powder is mixed with the resin as a filler, at a rate of 50% CaSO4 by weight. This CaSO4 is received in 50 lbs sacks and is mixed with resin in the day tanks. A small amount of the powder may escape during the mixing operation. Emissions were calculated using the emission factor for SCC 30101899, 0.8 lb/ton, and the result is shown in Table 2. Powder usage is 2800 TPY.

2.2 Emission Calculations for Emission Unit 002

Emission Unit 002 is the wood working shop. Here, wood is cut and stained for the exterior of the spa. Sawdust is controlled by a vacuum system that connects all of the saws in the shop to a fan by duct system. The sawdust is currently captured by a cyclone (93% efficient), which will be replaced by a bag house (99% efficient) when the operation is moved into the addition to the production building. Sawdust from the cyclone currently amounts to about one cubic yard per day, at an average density estimated to be 20 lb/CF, resulting in a current sawdust generation rate of approximately 600 lb/day. A safety factor of 2.0 was used to estimate sawdust generation at the increased spa production rate. At 365 days/yr, bag house emissions were calculated to be approximately 2.1 TPY, as shown in Table 3.

In the current permit, the stain's VOC content is limited to 2%. NGS requests that the stain's VOC content be increased to 5%, to allow improved product quality and manufacturing efficiency. Stain consumption is projected to be 75 TPY, and a 5% VOC content results in VOC emissions of 3.75 TPY.

Detailed calculations are shown in the spreadsheets of Attachment K.

TABLE 3. EMISSIONS SUMMARY FOR EMISSIONS UNIT 002, WOOD WORKING

	POLLUTANT EMISSIONS, TPY										
OPERATION	Styrene	MEK (H120)	Xylene (H186)	VA (H182)	HAPS	VOC	PM	PM10	NOX	CO	SO2
WOOD SHOP	0	0	0	0	0	0	2.1	0	0	0	0
STAIN/WOOD FINISH	0	0	0	0	0	3.8	0	0	0	0	0
TOTALS	**0.0**	**0.00**	**0.00**	**0.00**	**0.0**	**3.8**	**2.1**	**0.0**	**0.0**	**0.0**	**0.0**

ATTACHMENT J

STORAGE TANK EMISSIONS CALCULATIONS

TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

Identification No.:	RESIN #1
City:	Plant City
State:	FL
Company:	NEW GATSBY SPAS, INC.
Type of Tank:	Vertical Fixed Roof
Description:	RESIN STORAGE

Tank Dimensions

Shell Height (ft):	15.0
Diameter (ft):	10.0
Liquid Height (ft):	15.0
Avg. Liquid Height (ft):	8.0
Volume (gallons):	8814
Turnovers:	35.3
Net Throughput (gal/yr):	311134

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft):	0.00
Radius (ft) (Dome Roof):	0.00
Slope (ft/ft) (Cone Roof):	0.0000

Breather Vent Settings

Vacuum Setting (psig):	-0.10
Pressure Setting (psig):	0.10

Meteorological Data Used in Emission Calculations: Tampa, Florida (Avg Atmospheric Pressure = 14.7 psia)

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Styrene	All	74.01	68.83	79.19	72.02	0.1156	0.0973	0.1368	104.150			104.15	Option 2: A=7.1400, B=1574.510, C=224.090

Annual Emissions Report

Liquid Contents	Losses (lbs.): Standing	Working	Total
Styrene	11.25	89.18	100.42
Total:	11.25	89.18	100.42

TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

Identification No.:	RESIN #2
City:	Plant City
State:	FL
Company:	NEW GATSBY SPAS, INC.
Type of Tank:	Vertical Fixed Roof
Description:	RESIN STORAGE

Tank Dimensions

Shell Height (ft):	15.0
Diameter (ft):	10.0
Liquid Height (ft):	15.0
Avg. Liquid Height (ft):	8.0
Volume (gallons):	8814
Turnovers:	35.3
Net Throughput (gal/yr):	311134

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft):	0.00
Radius (ft) (Dome Roof):	0.00
Slope (ft/ft) (Cone Roof):	0.0000

Breather Vent Settings

Vacuum Setting (psig):	-0.10
Pressure Setting (psig):	0.10

Meteorological Data Used in Emission Calculations: Tampa, Florida (Avg Atmospheric Pressure = 14.7 psia)

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Styrene	All	74.01	68.83	79.19	72.02	0.1156	0.0973	0.1368	104.150			104.15	Option 2: A=7.1400, B=1574.510, C=224.090

Annual Emissions Report

Liquid Contents	Losses (lbs.): Standing	Working	Total
Styrene	11.25	89.18	100.42
Total:	11.25	89.18	100.42

TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

Identification No.:	BRSIN #3
City:	Plant City
State:	FL
Company:	NEW GATSBY SPAS, INC.
Type of Tank:	Vertical Fixed Roof
Description:	RESIN STORAGE

Tank Dimensions

Shell Height (ft):	12.0
Diameter (ft):	8.0
Liquid Height (ft):	12.0
Avg. Liquid Height (ft):	6.0
Volume (gallons):	4513
Turnovers:	6.0
Net Throughput (gal/yr):	27078

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft):	0.00
Radius (ft) (Dome Roof):	0.00
Slope (ft/ft) (Cone Roof):	0.0000

Breather Vent Settings

Vacuum Setting (psig):	-0.10
Pressure Setting (psig):	0.10

Meteorological Data Used in Emission Calculations: Tampa, Florida (Avg Atmospheric Pressure = 14.7 psia)

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Styrene	All	74.01	68.83	79.19	72.02	0.1156	0.0973	0.1368	104.150			104.15	Option 2: A=7.1400, B=1574.510, C=224.090

Annual Emissions Report

Liquid Contents	Losses (lbs.): Standing	Working	Total
Styrene	6.21	7.76	13.97
Total:	6.21	7.76	13.97

TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

Identification No.:	DAY TANKS
City:	Plant City
State:	FL
Company:	NEW GATSBY SPAS, INC.
Type of Tank:	Vertical Fixed Roof
Description:	RESIN FOR DAILY USE

Tank Dimensions

Shell Height (ft):	6.0
Diameter (ft):	6.0
Liquid Height (ft):	6.0
Avg. Liquid Height (ft):	3.0
Volume (gallons):	1269
Turnovers:	123.0
Net Throughput (gal/yr):	156087

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft):	0.00
Radius (ft) (Dome Roof):	0.00
Slope (ft/ft) (Cone Roof):	0.0000

Breather Vent Settings

Vacuum Setting (psig):	0.00
Pressure Setting (psig):	0.00

Meteorological Data Used in Emission Calculations: Tampa, Florida (Avg Atmospheric Pressure = 14.7 psia)

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Styrene	All	74.01	68.83	79.19	72.02	0.1156	0.0973	0.1368	104.150			104.15	Option 2: A=7.1400, B=1574.510, C=224.090

Annual Emissions Report

Liquid Contents	Losses (lbs.): Standing	Working	Total
Styrene	2.65	18.37	21.02
Total:	2.65	18.37	21.02

ATTACHMENT K

DETAILED EMISSIONS CALCULATIONS

STYRENE EMISSIONS FROM SPA PRODUCTION LINE

SPAS/YR=	70000	
STYRENE WIPEDOWN=	0.36	LB/SPA
STYRENE CONTENT=	100	%
STYRENE EMISSION=	12.5	TPY
BULK RESIN (1ST COAT)=	28	LB/SPA NEAT
%STYRENE=	45	MAX
FILLER=	38	% OF MIX
SUPPRESSED?	NO	
UEF EMISSION FACTOR=	162	LB/TON (FLOW COATER/MECHANICAL NON-ATOMIZ
UEF STYRENE EMISSION=	79.4	TPY (FLOW COATER/MECHANICAL NON-ATOMIZED
BULK RESIN (2ND COAT)=	52	LB/SPA NEAT
%STYRENE=	45	MAX
FILLER=	38	% OF MIX
SUPPRESSED?	NO	
UEF EMISSION FACTOR=	162	LB/TON (FLOW COATER/MECHANICAL NON-ATOMIZ
UEF STYRENE EMISSION=	147.4	TPY (FLOW COATER/MECHANICAL NON-ATOMIZED
HAND LAMINATION RESIN=	3.6	LB/SPA NEAT
%STYRENE=	45.5	MAX
FILLER=	0	% OF MIX
SUPPRESSED?	NO	
UEF EMISSION FACTOR=	170	LB/TON (MANUAL, NO VAPOR SUPPRESSION)
UEF STYRENE EMISSION=	10.6	TPY
MOLD CLEANER EMISSIONS		
CLEANER USAGE=	50	GAL/YR
DENSITY=	8.35	LB/GAL
XYLENE CONTENT=	15	%
VOC CONTENT=	85	%
XYLENE EMISSION=	0.03	TPY BEFORE CONTROL
VOC EMISSION=	0.21	TPY BEFORE CONTROL
XYLENE EMISSION=	0.005	TPY AFTER CONTROL (FUGITIVES)
XYLENE EMISSIONS FROM STACK=	0.001	TPY AFTER CONTROL (STACK)
VOC EMISSION=	0.031	TPY AFTER CONTROL (FUGITIVES)
VOC EMISSION FROM STACK=	0.009	TPY AFTER CONTROL (STACK)

STYRENE EVAPORATION FROM PRODUCTION LINE

TOTAL RESIN/SPA=	83.6	LB/SPA
TOTAL STYRENE VAPORS=	**249.9**	**TPY (FLOW COATER/MECHANICAL NON-ATOMIZE**
TOTAL STYRENE VAPORS/SPA=	7.1	LB/SPA (FLOW COATER/MECHANICAL NON-ATOMIZ

MEK AND DIMETHYL PHTHALATE EMISSIONS FROM MEKP USE

PRODUCTION LINE RESIN USE=	5850000	LB/YR
PROD. MEK VAPOR LOSS=	351.0	LB/YR
TOOLING RESIN USE=	14000	LB/YR
TOOLING MEK VAPOR LOSS=	0.8	LB/YR

CONTROLLED EMISSIONS OF STYRENE FROM PRODUCTION LINE OPERATIONS

ENCLOSURE CAPTURE EFFICIENCY=	85.0	%
STYRENE VAPORS CAPTURED =	212.4	TPY
STYRENE VAPORS NOT CAPTURED=	37.5	
THERMAL OXIDIZER DRE=	95.0	%
STYRENE VAPORS FROM OXIDIZER=	10.6	
PROD. LINE STYRENE EMISSION=	**48.1**	**TPY FOR FLOW COATERS**
PROD. LINE MEK EMISSION=	0.03	**TPY**

STYRENE EMISSIONS FROM MISCELLANEOUS UNCONTROLLED SOURCES

STYRENE EMISSIONS FROM TOOLING RESIN

ANNUAL RESIN USE =	14,000	LB/YR
% STYRENE =	48	MAX
UEP EMISSION FACTOR =	187	LB/TON (MANUAL, NO VAPOR SUPPRESSION)
UEP STYRENE EMISSION =	0.7	TPY
VINYL ACETATE CONCENTRATION =	0.6	%
VINYL ACETATE EMISSION =	0.005	TPY (THIS IS BELOW REPORTING LIMIT)

SPRAY BOOTH AT TOOLING AREA

ANNUAL RESIN USE =	30,000	LB/YR
% STYRENE =	47	MAX
UEP EMISSION FACTOR =	318	LB/TON (SPRAY ATOMIZED, NO VAPOR SUPPRESSION)
UEP STYRENE EMISSION =	2.4	TPY

STYRENE EMISSIONS FROM STORAGE TANKS

2 RESIN STORAGE TANKS

THROUGHPUT =	622340	GAL RESIN/YR
TOTAL TANK CAPACITY =	17623	GAL
TURNOVERS/YR =	35	TURNOVERS/YR
TOTAL LOSSES PER TANK =	100	LB/YR
TOTAL LOSSES FOR 2 TANKS =	0.10	TPY

4 DAY TANKS

THROUGHPUT =	622340	GAL RESIN/YR
TOTAL TANK CAPACITY =	5075	GAL
TURNOVERS/YR =	123	TURNOVERS/YR
TOTAL LOSSES PER TANK =	21	LB/YR
TOTAL LOSSES FOR 4 TANKS =	0.04	TPY

MISC. RESIN STORAGE TANK

THROUGHPUT =	26596	GAL RESIN/YR
TOTAL TANK CAPACITY =	4511	GAL
TURNOVERS/YR =	6	TURNOVERS/YR
TOTAL LOSSES FOR TANK =	14	LB/YR
TOTAL LOSSES FOR TANK =	0.01	TPY

VOC EMISSIONS FROM MISCELLANEOUS SOURCES

HAP EMISSIONS FROM PVC CEMENT

PVC CEMENT USAGE =	30000	LB/YR
MEK CONTENT =	40	% (MAX)
VOC/MEK EMISSION FACTOR =	75	%, BASED ON EXPOSED AREA/TOTAL AREA, KNOWLEDGE OF PROCESS
MEK EMISSION =	4.50	TPY
VOC CONTENT =	88	% (MAX)
VOC EMISSION =	9.90	TPY

VOC SOLVENT EMISSIONS

ISOPROPANOL NET USAGE =	75000	LB/YR
IPA EMISSION FACTOR =	100	%
IPA EMISSIONS =	37.5	TPY

VOC EMISSIONS FROM STAIN OPERATION

STAIN USAGE =	150000	LB/YR
VOC CONTENT =	5	%
VOC EMISSION =	3.75	TPY

VOS EMISSIONS FROM FOAM SPRAY AREA - EMISSION OF CFC-141B

THESE EMISSIONS WILL BE CAPTURED AND CONTROLLED WITH THERMAL OXIDIZER

MDI USAGE PER SPA =	6.3	LB/SPA
RESIN USAGE PER SPA =	5.6	LB/SPA
AVAILABLE CFC-141B (USED IN PROCESS) =	29.5	TPY
CFC LOSS FROM PROCESS =	16.0	% OF AVAILABLE CFC, PER BASF
MAX CFC-141B CAPTURED =	4.7	TPY
CFC-141B IS DICHLOROFLUOROETHANE,	117.0	MOL WT
CHLORINE CONTENT =	60.7	%
FLUORINE CONTENT =	16.2	%
MAXIMUM POTENTIAL HCL EMISSION =	2.9	TPY
MAXIMUM POTENTIAL HF EMISSION =	0.8	TPY

PM EMISSIONS

SAWDUST EMISSIONS FROM WOOD SHOP

SAWDUST WASTE COLLECTION RATE =	1080	LB/DAY (54 CF CONTAINER EMPTIED EVERY 2 DAYS, SAWDUST @20LB/CF, SF=2)
CYCLONE EFFICIENCY =	93	%
SAWDUST GENERATION RATE =	1161	LB/DAY
BAG HOUSE EFFICIENCY =	99	%
PM SAWDUST EMISSION RATE =	2.1	TPY

FUGITIVE EMISSIONS FROM $CaSO_4$ POWDER ADDITIVE

$CaSO_4$ USAGE RATE =	2800	TPY
EMISSION FACTOR =	0.8	LB/TON USED (SCC 30101899)
PM10 $CaSO_4$ EMISSION RATE =	1.12	TPY

COMBUSTION RELATED EMISSIONS FOR 3 NATURAL GAS OVENS

RATING=	0.6	MMBTU/HR
HOURS OF OPERATION=	8760	HR/YR
POTENTIAL GAS USAGE=	11.35296	MMCF/YR

CRITERIA POLLUTANTS	AP-42 EF	EMISSION, TPY
NOX	100	0.5676
VOC	5.5	0.0312
CO	84	0.4768
PM	7.6	0.0431
PM10	7.6	0.0431
SO2	0.6	0.0034

COMBUSTION RELATED EMISSIONS FROM THERMAL OXIDIZER

CONTROLLED EMISSIONS OF STYRENE AND MEK WILL BE TREATED AS NATURAL GAS BECAUSE THE POLLUTANTS ARE IN VAPOR PHASE

HEAT CONTENT OF STYRENE= 18000 BTU/LB X 202 TPY X 2000 LB/T = 7265319750 BTU/YR

NATURAL GAS EQUIVALENT OF STYRENE= 7.27 MMCF

HEAT CONTENT OF MEK IS INSIGNIFICANT FROM PRODUCTION LINE

BURNER FOR OXIDIZER IS ESTIMATED TO BE 10 MMBTU/HR, OPERATED 8760 HR/YR, FOR GAS CONSUMPTION OF... 87.6 MMCF

TOTAL GAS EQUIVALENT BURNED = 94.87 MMCF

CRITERIA POLLUTANTS	AP-42 EF	EMISSION, TPY
NOX	140	6.6406
VOC	2.784	0.1321
CO	35	1.6601
PM	13.7	0.6498
PM10	13.7	0.6498
SO2	0.6	0.0285

ATTACHMENT L

MATERIAL SAFETY AND DATA SHEETS

BASF Corporation

07

BASF

Material Safety Data Sheet

Original Date: 10/12/1993
Revision Date: 10/04/1996

BASF CORPORATION POLYMERS DIVISION
1609 BIDDLE AVENUE

WYANDOTTE, MI 48192
(313) 246-5241

Emergency Telephone: (800) 424-9300 (CHEMTREC)
(800) 832-HELP (BASF Hotline) 4357
BOTH NUMBERS ARE AVAILABLE DAYS, NIGHTS, WEEKENDS, & HOLIDAYS.

SECTION 1 - PRODUCT INFORMATION

ELASTOPOR$H1017OR RESIN (CYL)
Product ID: NPU 553373
Common Chemical Name:
URETHANE SYSTEM RESIN COMPONENT
Synonyms:
NONE
Molecular Formula:
MIXTURE
Chemical Family: Not Applicable
Molecular Wt.: NOT ESTABLISHED

SECTION 2 - INGREDIENTS

Chemical Name:	CAS	Amount	
POLYOL	PROPRIETARY	75.0	%
PEL/TLV NOT ESTABLISHED			
FLAME RETARDANT	PROPRIETARY	10.0	%
PEL/TLV NOT ESTABLISHED			
SURFACTANT	PROPRIETARY	2.0	%
PEL/TLV NOT ESTABLISHED			
CATALYST	PROPRIETARY	2.0	%
PEL/TLV NOT ESTABLISHED			
DICHLOROFLUOROETHANE (HCFC-141b)	1717-00-6	15.0	%
PEL/TLV NOT ESTABLISHED			

SECTION 3 - PHYSICAL PROPERTIES

Color:	Amber					
Form/Appearance:	Liquid					
Odor:	Amine / Fluorocarbon					
Odor Intensity:	Mild					
	Typical	Low/High	U.O.M.			
Specific Gravity:	1.09			@	25	DEG C
Viscosity:	200		CYCLES/SEC	@	23	DEG.
pH:	NOT AVAILABLE					
	Typical	Low/High	Deg.	@	Pressure	
Boiling Pt:	NOT AVAILABLE					

SECTION 3 - PHYSICAL PROPERTIES (cont)

	Typical	Low/High	Deg.	@	Pressure
Freezing Pt:	NOT AVAILABLE				
Decomp. Tmp:	NOT AVAILABLE				

Solubility in Water Description: Not available
pH: Basic

SECTION 4 - FIRE AND EXPLOSION DATA

	Typical	Low/High	Deg.	Method
Flash Point:	93		C	TAG OPEN CUP
Autoignition:	NOT AVAILABLE			

Extinguishing Media:
Use water fog, foam, CO2 or dry chemical extinguishing media.
Fire Fighting Procedures:
Firefighters should be equipped with self-contained breathing apparatus and turn out gear.
Unusual Hazards:
There are no known unusual fire or explosion hazards.

SECTION 5 - HEALTH EFFECTS

Routes of entry for solids and liquids include eye and skin contact, ingestion and inhalation. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquified gases.

Acute Overexposure Effects:
Contact with the eyes and skin may result in irritation.
Inhalation of high concentrations of HCFC 141b can cause drowsiness, unconsciousness, headache, respiratory depression and death due to asphyxiation. Increased sensitivity of the heart to adrenalin; rapid heartbeat, irregular heartbeat and depressed cardiac function may also occur.
Inhalation may result in respiratory irritation. Ingestion may result in gastric disturbances.
Chronic Overexposure Effects:
The flame retardant contains an organophosphate which may cause nervous system disorders such as tremors and convulsions.
Female rats exposed to 20,000 ppm during pregnancy exhibited maternal toxicity with reduction in litter size and pup weight. There was no evidence of teratogenicity. Preliminary data from a two-year inhalation study indicated that 141b demonstrated little toxicity; however, rats exposed to 5,000 ppm and 20,000 ppm developed benign testicular tumors late in the study.
First Aid Procedures - Skin:
Wash affected areas with soap and water. Remove and launder contaminated clothing before reuse. Get immediate medical attention.
First Aid Procedures - Eyes:
Immediately rinse eyes with running water for 15 minutes. Get immediate medical attention.

SECTION 5 - HEALTH EFFECTS (cont)

First Aid Procedures - Ingestion:
If swallowed, dilute with water and immediately induce vomiting. Never give fluids or induce vomiting if the victim is unconscious or having convulsions. Get immediate medical attention.

First Aid Procedures - Inhalation:
Move to fresh air. Aid in breathing, if necessary, and get immediate medical attention.

First Aid Procedures - Notes to Physicians:
The organophosphate contained in the flame retardant may inhibit cholinesterase; this inhibtion may be treated with a combination of atropine and praladoxime.

First Aid Procedures - Aggravated Medical Conditions:
Individuals with preexisting diseases of the central nervous system, respiratory or cardiovascular system may have increased susceptibility to excessive exposures.

First Aid Procedures - Special Precautions:
None

SECTION 6 - REACTIVITY DATA

Stability Data:
Stable

Incompatability:
Avoid moisture to protect product quality.

Conditions/Hazards to Avoid:
Exposure to moisture and temperatures 80F.

Hazardous Decomposition/Polymerization:
Hazardous Decomposition Products: HCl, HF (From HCFC 141B) CO and CO2.

Corrosive Properties:
Not corrosive.

Oxidizer Properties:
Not an oxidizer

Other Reactivity Data:
None known.

SECTION 7 - PERSONAL PROTECTION

Clothing:
Gloves, coveralls, apron, boots as necessary to prevent skin contact.

Eyes:
Chemical goggles; also wear a face shield if splashing hazard exists.

Respiration:
Approved organic vapor mist respirator as necessary.

Ventilation:
Use local exhaust to control vapors/mists.

Explosion Proofing:
None required.

Other Personal Protection Data:
Avoid contact with skin as required by good normal hygiene practices.

SECTION 8 - SPILL-LEAK/ENVIRONMENTAL

General:
Spills should be contained, solidified and placed in suitable containers for disposal in a RCRA licensed facility. This material is RCRA hazardous due to its properties.

Waste Disposal:
Incinerate or bury in a RCRA licensed facility. Do not discharge into waterways or sewer systems without proper authority.

Container Disposal:
DO NOT DISPOSE OF EMPTY CONTAINERS: Empty containers are to be returned to the supplier. Empty cylinders (all sizes) must be depressurized before they are transported. One complete depressurization is sufficient. Failure to depressurize and seal the empty tanks for return is a violation of the Department of Transportation regulations .

SECTION 9 - STORAGE AND HANDLING

General:
Do not apply heat to any cylinder or tank by direct contact (band heaters, etc.). Use indirect heating methods only to avoid damage to the chemicals and to avoid sudden discharge via the pressure relief valve. Do not store tanks in direct sunlight, but rather in a cool, well ventilated area.

Other Storage and Handling Data:
INCOMPATIBLE MATERIALS FOR PACKAGING: Stored and transported in a cylinder under pressure. Must not be repacked by the customer. Do not pressurize any tank with any gas other than dry nitrogen to prevent any reaction with the chemicals.

SECTION 10 - REGULATORY INFORMATION

TSCA Inventory Status
Listed on Inventory: YES

SARA - 313 Listed Chemicals:
CAS: 1717-00-6 AMOUNT: 15.0 %
NAME: DICHLOROFLUOROETHANE (HCFC-141b)

RCRA Haz. Waste No .: NA

Hazard Ratings:

	Health:	Fire:	Reactivity:	Special:
HMIS	2	1	1	NA

This product is hazardous or contains components which are hazardous according to the OSHA Hazard Communication Standard.
THIS PRODUCT MAY CONTAIN ONE OR MORE CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS AND/OR OTHER REPRODUCTIVE HARM.
THIS PRODUCT CONTAINS AN HCFC COMPOUND WHICH IS SUBJECT TO A SIGNIFICANT NEW USE RULE. 40 CFR 721.3200. AS SUCH, IT IS ALSO SUBJECT TO TSCA SECTION 12(b) EXPORT NOTIFICATION, AND THE MANUFACTURER OF THE MATERIAL IS SUBJECT TO SECTION 5(e) CONSENT ORDERS.

SECTION 11 - TRANSPORTATION INFORMATION

See Bill of Lading for Proper Shipping Information.
"IMPORTANT: WHILE THE DESCRIPTIONS, DESIGNS, DATA AND INFORMATION CONTAINED HEREIN ARE PRESENTED IN GOOD FAITH AND BELIEVED TO BE ACCURATE, IT IS PROVIDED FOR YOUR GUIDANCE ONLY. BECAUSE MANY FACTORS MAY AFFECT PROCESSING OR APPLICATION/USE, WE RECOMMEND THAT YOU MAKE TESTS TO DETERMINE THE SUITABILITY OF A PRODUCT FOR YOUR PARTICULAR PURPOSE PRIOR TO USE. NO WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE REGARDING PRODUCTS DESCRIBED OR DESIGNS, DATA OR INFORMATION SET FORTH, OR THAT THE PRODUCTS, DESIGNS, DATA OR INFORMATION MAY BE USED WITHOUT INFRINGING THE INTELLECTUAL

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END OF DATA SHEET

SECTION 10 - REGULATORY INFORMATION (cont)

SARA - 313 Listed Chemicals:

CAS:	101-68-8	AMOUNT:	45.0 %
NAME:	4,4' DIPHENYLMETHANE DIISOCYANATE		
CAS:	28	AMOUNT:	100.0 %
NAME:	DIIOSCYANATES		

RCRA Haz. Waste No .: NO
CERCLA: YES Reportable Qty.: (If YES) 5000 LBS
Hazard Ratings:

	Health:	Fire:	Reactivity:	Special:
HMIS	3	1	1	NA

This product is hazardous or contains components which are hazardous according to the OSHA Hazard Communication Standard.

SECTION 11 - TRANSPORTATION INFORMATION

See Bill of Lading for Proper Shipping Information.

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END OF DATA SHEET

Material Safety Data Sheet

Original Date: 10/20/1993
Revision Date: 11/04/1998

BASF CORPORATION
1609 BIDDLE AVENUE

WYANDOTTE, MI 48192
(734) 324-5244

EMERGENCY TELEPHONE: (800) 424-9300 (CHEMTREC)
(800) 832-HELP (BASF Hotline)
BOTH NUMBERS ARE AVAILABLE DAYS, NIGHTS, WEEKENDS, & HOLIDAYS.

SECTION 1 - PRODUCT INFORMATION

WUC(R) 3089T ISOCYANATE (CYL)

Product ID: NPU 553375
Common Chemical Name:
POLYMETHYLENE POLYPHENYLISOCYANATE
Synonyms:
POLYMERIC MDI
Molecular Formula:
MIXTURE
Chemical Family: MDI Based Isocyanate
Molecular Wt.: 360.0

SECTION 2 - INGREDIENTS

Chemical Name:		CAS	Amount
4,4' DIPHENYLMETHANE DIISOCYANATE		101-68-8	45.0 %
ACGIH TLV	TWA	0.005 PPM	
OSHA PEL	CEIL	0.02 PPM	
POLYMERIC MDI		9016-87-9	< 50.0 %
PEL/TLV NOT ESTABLISHED			
MDI MIXED ISOMER		26447-40-5	< 5.0 %
PEL/TLV NOT ESTABLISHED			

SECTION 3 - HAZARDS IDENTIFICATION

Emergency Overview
Color: Clear Brown
Form/Appearance: Liquid
Odor: Aromatic
WARNING STATEMENT:
CAUTION:
CONTAINS DIPHENYLMETHANE DIISOCYANATE (CAS NO. 101-68-8).
INHALATION OF MDI MISTS OR VAPORS MAY CAUSE RESPIRATORY IRRITATION, BREATHLESSNESS, CHEST DISCOMFORT AND REDUCED PULMONARY FUNCTION. OVEREXPOSURE WELL ABOVE THE PEL MAY RESULT IN BRONCHITIS, BRONCHIAL SPASMS AND PULMONARY EDEMA. LONG-TERM EXPOSURE TO ISOCYANATES HAS BEEN REPORTED TO CAUSE LUNG DAMAGE, INCLUDING REDUCED LUNG FUNCTION WHICH MAY BE PERMANENT. ACUTE OR CHRONIC OVEREXPOSURE TO ISOCYANATES MAY CAUSE SENSITIZATION IN SOME INDIVIDUALS, RESULTING IN ALLERGIC

SECTION 3 - HAZARDS IDENTIFICATION (cont)

RESPIRATORY REACTIONS INCLUDING WHEEZING, SHORTNESS OF BREATH AND DIFFICULTY BREATHING. RESULTS FROM A LIFETIME INHALATION STUDY IN RATS INDICATE THAT MDI AEROSOL WAS CARCINOGENIC AT 6 MG/M3, THE HIGHEST DOSE TESTED. THIS IS WELL ABOVE THE RECOMMENDED TLV OF 5 PPB (0.05 MG/M3). ONLY IRRITATION WAS NOTED AT THE LOWER CONCENTRATIONS OF 0.2 AND 1 MG/M3.

Potential Health Effects
Primary Routes of Exposure:
Routes of entry for solids and liquids include eye and skin contact, ingestion and inhalation. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquified gases.

Acute Overexposure Effects:
Eye contact with isocyanates may result in conjunctival irritation and mild corneal opacity. Skin contact may result in dermatitis, either irritative or allergic.
Inhalation of MDI vapors may cause irritation of the mucous membranes of the nose, throat or trachea, breathlessness, chest discomfort, difficult breathing and reduced pulmonary function. Airborne overexposure well above the PEL may result additionally in eye irritation, headache, chemical bronchitis, asthma-like findings or pulmonary edema. Isocyanates have also been reported to cause hypersensitivity pneumonitis, which is characterized by flu-like symptoms, the onset of which may be delayed. Gastrointestinal symptoms include nausea, vomiting and abdominal pain.
Chronic Overexposure Effects:
Results from a lifetime inhalation study in rats indicate that MDI aerosol was carcinogenic at 6 mg/m3, the highest dose tested. This is well above the recommended TLV of 5 ppb (0.05 mg/m3). Only irritation was noted at the lower concentration of 0.2 and 1 mg/m3. No birth defects or teratogenic effects were reported in a teratology study with rats exposed to 1, 4, and 12 mg/m3 polymeric MDI for 6 hr/day on days 6-15 of gestation. Embryotoxicity and fetotoxicity was reported at the top dose in the presence of maternal toxicity.
As a result of previous repeated overexposures or a single large dose, certain individuals will develop isocyanate sensitization (chemical asthma) which will cause them to react to a later exposure to isocyanate at levels well below the PEL/TLV. These symptoms, which include chest tightness, wheezing, cough, shortness of breath, or asthmatic attack, could be immediate or delayed up to several hours after exposure. Similar to many non-specific asthmatic responses, there are reports that once sensitized an individual can experience these symptoms upon exposure to dust, cold air, or other irritants. This increased lung sensitivity can persist for weeks and in severe cases for several years. Chronic overexposure to isocyanates has also been reported to cause lung damage, including a decrease in lung function, which may be permanent. Sensitization may be either temporary or permanent. Prolonged contact can cause reddening, swelling, rash, scaling, or blistering. In those who have developed a skin sensitization, these symptoms can develop as a

SECTION 3 - HAZARDS IDENTIFICATION (cont)

result of contact with very small amounts of liquid material, or even as a result of vapor-only exposure.

First Aid Procedures - Aggravated Medical Conditions:
Individuals who are sensitized to isocyanates and those with pre-exisiting lung diseases or conditions, including non-specific bronchial hyperreactivity or asthma, must avoid all exposure to isocyanates.

SECTION 4 - FIRST AID MEASURES

First Aid Procedures - Skin:
Wash affected areas with soap and water. Remove and launder contaminated clothing before reuse. Get immediate medical attention.

First Aid Procedures - Eyes:
Immediately rinse eyes with running water for 15 minutes. Get immediate medical attention.

First Aid Procedures - Ingestion:
If swallowed, dilute with water. DO NOT INDUCE VOMITING. Never give fluids or induce vomiting if the victim is unconscious or having convulsions. Get immediate medical attention.

First Aid Procedures - Inhalation:
Move to fresh air. Aid in breathing, if necessary, and get immediate medical attention.

First Aid Procedures - Notes to Physicians:
There is no specific antidote to counteract the effects of MDI. Care should be supportive and treatment should be based on the judgement of the physician in response to the reaction of the patient.

First Aid Procedures - Aggravated Medical Conditions:
Individuals who are sensitized to isocyanates and those with pre-exisiting lung diseases or conditions, including non-specific bronchial hyperreactivity or asthma, must avoid all exposure to isocyanates.

First Aid Procedures - Special Precautions:
None

Other First Aid Procedures:
Medical supervision of all employees who handle or come into contact with MDI is recommended. Preemployment and periodic medical examinations with respiratory function tests (FEV, FVC as a minimum are suggested). Persons with asthmatic conditions chronic bronchitis, other chronic respiratory diseases, recurrent eczema or pulmonary sensitization should be excluded from working with MDI. Once a person is diagnosed as having pulmonary sensitization (allergic asthma) to MDI, further exposure is not permissible.

SECTION 5 - FIRE FIGHTING MEASURES

	Typical	Low/High	Deg.	Method
Flash Point:	220		C	OPEN CUP
Autoignition:	NOT AVAILABLE			

Extinguishing Media:
Use water fog, foam, CO2 or dry chemical extinguishing media.

SECTION 5 - FIRE FIGHTING MEASURES (cont)

Fire Fighting Procedures:
Personnel engaged in fighting isocyanate fires must be protected against nitrogen dioxide fumes as well as isocyanate vapors. Firefighters must wear self-contained breathing apparatus and turnout gear.

Unusual Hazards:
Avoid water contamination in closed containers or confined areas (CO_2 evolved).

SECTION 6 - ACCIDENTAL RELEASE MEASURES

General:
General:
Evacuate and ventilate spill area, dike spill to prevent entry into water system, wear full protective equipment including respiratory equipment during clean up. (See Section 7).
MAJOR SPILL:
Call BASF Corporation @ 1-800-832-4357. If transportation spill involved, call CHEMTREC @ 1-800-424-9300. If temporary control of isocyanate vapor is required a blanket of protein foam or other suitable foam (available at most fire departments), may be placed over the spill. Transfer as much liquid as possible via pump or vacuum device into closed but not sealed containers for disposal. Proceed with clean up of rest of material as described in "Minor Spill".
MINOR SPILL:
Absorb the isocyanate with an acceptable absorbent per the Hazardous and Solid Waste Amendments of 1984 (HSWA). See 40 CFR sections 260, 264, and 265 for further information. Shovel into open top containers Do not make pressure tight. Transport to a well ventilated area (outside) and treat with neutralizing solution consisting of a mixture of 90% water, 3-8% ammonia and 2-7% detergent. Add about 10 parts of neutralizer per part of isocyanate with mixing. Allow to stand for 48 hours letting evolved carbon dioxide to escape. Proceed with final "clean up" of spill area.
CLEAN UP:
Decontaminate spill area using neutralizing solution and letting stand over affected areas for at least 10 minutes.

SECTION 7 - STORAGE AND HANDLING

General:
Do not apply heat to any cylinder or tank by direct contact (band heaters, etc.). Use indirect heating methods only to avoid damage to the chemicals and to avoid sudden discharge via the pressure relief valve. Do not store tanks in direct sunlight, but rather in a cool, well ventilated area.

Other Storage and Handling Data:
INCOMPATIBLE MATERIALS FOR PACKAGING: Stored and transported in a cylinder under pressure. Must not be repacked by the customer. Do not pressurize any tank with any gas other than dry nitrogen to prevent any reaction with the chemicals.

SECTION 8 - PERSONAL PROTECTION

Clothing:
Rubber gloves, coveralls, hard hat, boots and rubber apron to avoid skin contact. Contaminated equipment or clothing should be cleaned after each use or disposed of.

Eyes:
Wear fitted chemical goggles or face shield and safety glasses.

Respiration:
If the permissible exposure limit is exceeded, wear a NIOSH approved air-supplied respirator.

Ventilation:
Use local exhaust as necessary to maintain P.E.L.

Explosion Proofing:
None required.

Other Personal Protection Data:
Eyewash fountains and safety showers must be easily accessible.
Maintain work area below P.E.L.

SECTION 9 - PHYSICAL PROPERTIES

Color:	Clear Brown						
Form/Appearance:	Liquid						
Odor:	Aromatic						
Odor Intensity:	Slight						
	Typical	Low/High	U.O.M.				
Specific Gravity:	1.22			@	25	DEG C	
Viscosity:	200		CENTIPOISE	@	25	DEG.	
pH:	NOT AVAILABLE						
	Typical	Low/High	Deg.	@	Pressure		
Boiling Pt:	200		C	5	MM HG		
Freezing Pt:	NOT AVAILABLE						
Decomp. Tmp:	NOT AVAILABLE						

Solubility in Water Description: Water reactive
Vapor pressure 0.00001 mm Hg @ 25 deg. C

SECTION 10 - STABILITY AND REACTIVITY

Stability Data:
Stable

Incompatability:
Water, alcohols and strong bases.

Conditions/Hazards to Avoid:
Reaction with moisture may form CO2.

Hazardous Decomposition/Polymerization:
Hazardous decomposition products: CO, NOx, HCN
Polymerization: May occur.

Corrosive Properties:
Not corrosive.

Oxidizer Properties:
Not an oxidizer

SECTION 10 - STABILITY AND REACTIVITY (cont)

Other Reactivity Data:
Hazardous polymerization may occur. Avoid contamination with moisture and other products that react with isocyanates. Contact with certain rubbers and plastics can cause imbrittlement of the material with subsequent loss in strength.

SECTION 11 - TOXICOLOGICAL INFORMATION

Toxicology Test Data:
Rat, 4 hr Inhalation LC50 - AEROSOL 490 MG/CU. M
Highly Toxic
Rat, 4 hr Inhalation LC50 - VAPOR MG/L
Toxic
Rat, Oral LD50 - > 10,000 MG/KG
Practically Nontoxic
Rat, Inhalation Oncogenicity Study - @ °0.2, 1, 6 MG/CU. M
URT irritant; Carcinogenic @ 6 mg/m3

SECTION 12 - ECOLOGICAL INFORMATION

Environmental Toxicity Test Data:
Daphnia magna, 24 hr LC50 - > 500 MG/L
Practically Nontoxic
Zebra Fish, Static 24 hr LC50 - > 500 MG/L
Practically Nontoxic

SECTION 13 - DISPOSAL CONSIDERATION

Waste Disposal:
Incinerate or landfill in a licensed facility. Do not discharge into waterways or sewer systems.

Container Disposal:
DO NOT DISPOSE OF EMPTY CONTAINERS: Empty containers are to be returned to the supplier. Empty cylinders (all sizes) must be depressurized before they are transported. One complete depressurization is sufficient. Failure to depressurize and seal the empty tanks for return is a violation of the Department of Transportation regulations .

SECTION 14 - TRANSPORTATION INFORMATION

DOT Proper Shipping Name:
SEE BELOW
DOT Technical Name:
SEE BELOW
DOT Primary Hazard Class:
SEE BELOW
DOT Secondary Hazard Class:
SEE BELOW
DOT Label Required:
SEE BELOW
DOT Placard Required:
SEE BELOW
DOT Poison Constituent:
SEE BELOW
BASF Commodity Codes: UN/NA Code: 2489 E/R Guide:
Bill of Lading Description:

SECTION 14 - TRANSPORTATION INFORMATION (cont)

< 793 GALLONS NOT REGULATED BY THE DEPARTMENT OF TRANSPORTATION
> 793 GALLONS RQ, OTHER REGULATED SUBSTANCES, LIQUID, NOS, (MDI), 9, NA3082, PG III

SECTION 15 - REGULATORY INFORMATION

TSCA Inventory Status
Listed on Inventory: YES
SARA - 313 Listed Chemicals:
CAS: 28 AMOUNT: 100.0 %
NAME: DIIOSCYANATES
CERCLA: YES Reportable Qty.: (If YES)
XXXXXXX XXXXXXXXXXXXXX 5000 LBS

SECTION 16 - OTHER INFORMATION

Hazard Ratings:
BASF currently uses the National Paint & Coating Association (NPCA) rating system. The use of an asterisk (*) in the HMIS rating indicates the potential for chronic health effects.

	Health:	Fire:	Reactivity:	Special:
HMIS	3	1	1	NA

This product is hazardous or contains components which are hazardous according to the OSHA Hazard Communication Standard.

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SECTION 16 - OTHER INFORMATION (cont)

END OF DATA SHEET