# Department of
# Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary


State of Florida
Department of Environmental Protection
Notice of Permit Modification

In the Matter of an
Application for Permit Modification

DEP File No. AC 48-214902A
County: Orange

Mr. Douglas L. Terrill
Plant Manager
Foamex, L.P.
1351 Gemini Boulevard
Orlando, Florida 32837

Enclosed is a letter that modifies Permit Number AC 48-214902 for for your flexible polyurethane foam manufacturing facility located at 1351 Gemini Boulevard, Orlando, Orange County, Florida 32837. The permit modification will allow an increase of 19 tons per year in methylene chloride emissions, a reconfiguration of the foam fabrication operation that will reduce the number of ventilation fans, and an extension of the expiration date of this permit. This permit modification is issued pursuant to Section 403, Florida Statutes.

Any party to this Order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, Florida Statutes, by filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399-3000; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 14 days from the date this Notice is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

C. H. Fancy, P.E., Chief
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400
904-488-1344

Foamex, L.P.

Permit No. AC 48-214902A

**CERTIFICATE OF SERVICE**

The undersigned duly designated deputy clerk hereby certifies that this NOTICE OF PERMIT MODIFICATION and all copies were mailed by before the close of business on 6-21-96 to the listed persons.

Clerk Stamp

**FILING AND ACKNOWLEDGMENT**
**FILED**, on this date, pursuant to §120.52(11), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Kyri Dobson 6-21-96
Clerk Date

Copies furnished to:

L. Kozlov, CD
D. Nester, OCEPD
K. Rykowski, HLA

FINAL DETERMINATION

Foamex, L.P.
AC 48-214902A

The Intent to Issue an air construction permit modification to Foamex, L.P. to increase methylene chloride emissions from their flexible polyurethane foam manufacturing facility located in Orlando, Orange County, Florida was distributed on May 3, 1996. The Notice of Intent to Issue was published in the Orlando Sentinel on May 21, 1996.

The only comments received in response to the public notice was from the applicant. Foamex requested the allowable methylene chloride emissions from the facility and the slabstock polyurethane foam process be clarified. The Department agreed to this request and reworded the changes to proposed Specific Condition No. 2.

The final action of the Department will be to issue the construction permit modification as proposed except for the change discussed above.

# Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary


June 19, 1996

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Douglas L. Terrill, Plant Manager
Foamex, L.P.
1351 Gemini Boulevard
Orlando, Florida 32821

Dear Mr. Terrill:

Re: Modification of Permit
Permit No. AC 48-214902A

The Department is in receipt of your March 5 and March 15 letters requesting the permit for your flexible polyurethane foam manufacturing facility located at 1351 Gemini Boulevard, Orlando, Orange County, Florida 32821, be modified. The requested modifications are to allow a 19 TPY increase in methylene chloride emissions, to reconfigure the foam fabrication operation so that 14 of the roof ventilation fans will no longer be needed, and to extend the expiration date of the permit so that a carbon dioxide system which will replace part of the methylene chloride used in the process can be installed. Part of these requests is acceptable. The Department will require a permit to operate the plant before the carbon dioxide system is fully operational. In response to your request, permit No. AC 48-214902 is modified as follows:

EXPIRATION DATE

From: May 15, 1996
To: May 15, 1997

SPECIFIC CONDITION NO. 1

From:

The enhanced exhaust systems shall be completed by February 15, 1996. The systems shall include: two 2.8 ft. diameter by 125 ft. high stacks, each handling 30,000 acfm of air; seventeen roof exhaust fans with 3.6 ft. diameter 53 ft. high stacks, each handling

50,000 acfm of air; and two roof exhaust fans with 2 ft. diameter by 53 ft. high stacks, each handling 15,000 acfm of air. The two 125 ft. high stacks shall be equipped with stack sampling facilities meeting the specifications listed in Rule 62-297.345, F.A.C. Tank No. 10 shall be equipped with a pressure/vacuum relief valve.

To:

The enhanced exhaust systems shall **meet or exceed the following specifications.** The systems shall include: two 2.8 ft. diameter by 125 ft. high stacks, each handling 30,000 acfm of air; **three** roof exhaust fans with 3.6 ft. diameter 53 ft. high stacks, each handling 50,000 acfm of air; and two roof exhaust fans with 2 ft. diameter by 53 ft. high stacks, each handling 15,000 acfm of air. The two 125 ft. high stacks shall be equipped with stack sampling facilities meeting the specifications listed in Rule 62-297.345, F.A.C. Tank No. 10 shall be equipped with a pressure/vacuum relief valve.

SPECIFIC CONDITION NO. 2

From:

The chemicals used at the facility shall not exceed the following quantities during any twelve month period: 513,090 lbs/yr (256.6 TPY) methylene chloride; 1,000,000 lbs/yr (500 TPY) polymer; 15,000,000 lbs/yr (7,500 TPY) polyol; and 10,000,000 lbs/yr (5,000 TPY) toluene diisocyanate. Cleanup solvent losses shall not exceed: 20 gallons/month isopropyl alcohol; 5,770 lbs/yr 1,1,1,-trichloroethane with silicone lubricant; and 1,000 lbs/yr mineral spirits.

Compliance with this condition shall be determined by records of purchases, inventory changes, and receipts for chemicals disposed of off site. The permittee shall maintain a log showing the amount of chemicals used each month to document compliance with these limitations.

To:

**The methylene chloride used as a blowing agent in the Slabstock Polyurethane Foam Process at the facility shall not exceed 551,192 pounds (275.6 tons) during any twelve month period.** The **other** chemicals used **in the manufacturing process** at the facility shall not exceed the following quantities during any twelve month period: 1,000,000 lbs/yr (500 TPY) polymer; 15,000,000 lbs/yr (7,500 TPY)

polyol; and 10,000,000 lbs/yr (5,000 TPY) toluene diisocyanate. Cleanup solvent losses shall not exceed: 20 gallons/month isopropyl alcohol; 5,770 lbs/yr 1,1,1,-trichloroethane with silicone lubricant; and 1,000 lbs/yr mineral spirits.

Compliance with this condition shall be determined by records of purchases, inventory changes, and receipts for chemicals disposed of off site. The permittee shall maintain a log showing the amount of chemicals used each month to document compliance with these limitations.

SPECIFIC CONDITION NO. 4

From:

For inventory purposes, the estimated emissions from this facility (based on the emission factors listed in the application, the limitations on operation time, and chemical usage) are:

AVERAGE EMISSIONS FROM FACILITY OPERATIONS:

| Chemicals | Emissions lbs/hr | TPY |
|---|---|---|
| methylene chloride | 2,222 | 261 |
| 1,1,1-trichloroethane | 2.5 | 1.86 |
| toluene diisocyanate | 0.375 | 0.42 |

MAXIMUM POTENTIAL EMISSIONS FROM INDIVIDUAL OPERATIONS ARE ESTIMATED TO BE:

| | Operation/chemical | Emissions lbs/hr | TPY |
|---|---|---|---|
| I. | Slabstock Polyurethane Foam Production/toluene diisocyanate | 0.37 | 0.40 |
| II. | Foam Line Stack/ methylene chloride | 1,400 | 153.93 |
| III. | Long Bun Storage Room Stack/ methylene chloride | 816.7 | 89.8 |
| IV. | Foam Fabrication Operations/ methylene chloride | 5.1 | 14.4 |
| | 1,1,1-trichloroethane | 2.5 | 1.86 |

| | | | |
|---|---|---|---|
| V. | Rebond Polyurethane Foam Production/ toluene diisocyanate | 0.0046 | 0.017 |
| VI. | Tank Storage (Tank No. 10) methylene chloride | 0.66 | 2.92 |
| VII. | Steam Boiler | Trace amounts of the normal products of combustion (Less than 1 lb/hr of all pollutants) | |
| VIII. | Environmental Heating | Trace amounts of the normal products of combustion (less than 1 lb/hr of all pollutants) | |

To:

For inventory purposes, the estimated emissions from this facility (based on the emission factors listed in the application, the limitations on operation time, and chemical usage) are:

AVERAGE EMISSIONS FROM FACILITY OPERATIONS:

| Chemicals | Emissions lbs/hr | TPY |
|---|---|---|
| methylene chloride | 2,223 | **280** |
| 1,1,1-trichloroethane | 2.5 | 1.86 |
| toluene diisocyanate | 0.375 | 0.42 |

MAXIMUM POTENTIAL EMISSIONS FROM INDIVIDUAL OPERATIONS ARE ESTIMATED TO BE:

| | Operation/chemical | Emissions lbs/hr | TPY |
|---|---|---|---|
| I. | Slabstock Polyurethane Foam Production/toluene diisocyanate | 0.37 | 0.40 |
| II. | Foam Line Stack/ methylene chloride | 1,400 | **165.36** |
| III. | Long Bun Storage Room Stack/ methylene chloride | 816.7 | **96.5** |
| IV. | Foam Fabrication Operations/ methylene chloride | **5.3** | **15.4** |
| | 1,1,1-trichloroethane | 2.5 | 1.86 |

| | | | |
|---|---|---|---|
| V. | Rebond Polyurethane Foam Production/ toluene diisocyanate | 0.0046 | 0.02 |
| VI. | Tank Storage (Tank No. 10) methylene chloride | 0.66 | 2.92 |
| VII. | Steam Boiler | Trace amounts of the normal products of combustion (Less than 1 lb/hr of all pollutants) | |
| VIII. | Environmental Heating | Trace amounts of the normal products of combustion (less than 1 lb/hr of all pollutants) | |

Specific Condition No. 8

From:

An application for an operation permit shall be submitted to the Department's Central District office at least 90 days prior to the expiration date of this construction permit. To properly apply for an operation permit, the applicant shall submit the appropriate application form, fee, certification that construction was completed noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit. (Rules 62-4.055 and 62-4.220, F.A.C.)

To:

**The permittee shall comply with the application requirements in Rule 62-213.420, F.A.C., for Title V operation permits.**

A copy of this letter shall be attached to permit number AC 48-214902 and shall become a part of that permit.

Sincerely,

Howard L. Rhodes, Director
Division of Air Resources Management

HLR/wh/t

Enclosures

**TRANSMITTAL**

**To:** Mr. Willard Hanks
Mr. C.H. Fancy, Jr.
FDEP - Tallahassee

**From:** Joe Tessitore
Kay Rykowski
HLA Orlando

**Date:** March 5, 1996

**Subject:** Foamex, Orlando Facility

**Project Number:** 26005.F21.816

RECEIVED
MAR 06 1996
BUREAU OF
AIR REGULATION

Please find enclosed:

- A letter request for amendment to Permit AC48-214902 for the Foamex foam manufacturing facility in Orlando;
- Attachment A - Revised Pages to Volume I of the Original Permit Application (1 copy);
- Attachment B - Revised Pages to Volume II: Dispersion Modeling Analysis, of the Original Permit Application (1 copy)
- Attachment C - Output Listings from Revised Modeling (Appendixes D,E,F,I and J of Volume II of Original Permit Application) (1 copy)
- Check No. 487130 in the amount of $1000.00 for applicaton processing fee.

As we discussed during our meeting on February 22, this amendment is requested to allow an increase in production at the facility, in preparation for installation of a new manufacturing technology. The proposed increase in methylene chloride usage results in an increase in the maximum annual groundlevel concentration of approximately 10%, however this maximum concentration does not exceed the FDEP Acceptable Ambient Concentration.

If you have any questions regarding this submittal, please do not hesitate to contact Kay Rykowski or Joe Tessitore at (407) 851-1484.

pkr\trans001.doc

Attachments

cc: Doug Terrill, Foamex; Orlando, Florida
Tom Burghardt, Foamex; Linwood, Pennsylvania

**Harding Lawson Associates**
Engineering and Environmental Services
4763 South Conway Road
Orlando, Florida 32812 - (407) 851-1484

**Harding Lawson Associates**

March 4, 1996

26005.F21.816

Mr. C. H. Fancy, P.E.
Chief
Bureau of Air Regulation
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

**RECEIVED**

MAR 06 1996

BUREAU OF
AIR REGULATION

**Request for Permit Amendment**
**Foamex, L.P.**
**Permit No. AC48-214902**

Dear Mr. Fancy:

INTRODUCTION

This letter is to request an amendment to Construction Permit AC48-214902, issued to Foamex, L.P. This letter presents a summary of the requested changes to Specific Conditions 1, 2, and 4 issued by FDEP. As discussed with you during our meeting on February 22, the requested changes include an increase in the annual methylene chloride usage and a modification to the enhanced exhaust system for the foam fabrication operations. This amendment is requested to allow Foamex to increase production at their Orlando facility in the short term, in preparation for future installation of an alternate manufacturing technology that will greatly reduce methylene chloride emissions.

As discussed in the following comments and supported by the attachments, the predicted maximum ground level concentration for methylene chloride and 1,1,1-trichloroethane do not exceed the FDEP Acceptable Ambient Air Concentrations (AAAC) as a result of the requested changes to Specific Conditions 1, 2, and 4.

COMMENT 1

Foamex requests a change to reduce the number of exhaust fans for the foam fabrication operations from seventeen exhaust fans to three exhaust fans. As discussed in Foamex's First and Second Progress Reports (June 30, 1995 and January 31, 1996, respectively), this change is requested to minimize energy consumption and capital and operating costs. The foam fabrication operations will be isolated to smaller areas, thereby reducing the number of exhaust fans required to exhaust the foam fabrication emissions to only three fans rather than seventeen as outlined in the original permit application. The fourteen existing roof exhaust fans which will not be used for the foam fabrication exhaust system will be blocked off. The three fans to be used for the foam fabrication operations exhaust system are source numbers 7, 12, and 19 as identified in the original permit application and in the attached supporting documentation.

The new exhaust fan configuration has the minimal effect on the dispersion modeling analysis of slightly concentrating the foam fabrication operations emissions to the area of the three exhaust fans

as opposed to these emission being spread out over the area of the seventeen fans as originally proposed. The dispersion modeling has been revised to account for the new exhaust fan configuration. This change only impacts the modeling results for methylene chloride and 1,1,1-trichloroethane, the only pollutants emitted from the foam fabrication exhaust fans. The results of the revised modeling analysis, presented below, show that the 8-hour and 24-hour maximum ground level concentrations for methylene chloride and 1,1,1-trichloroethane are below the applicable FDEP AAAC's. The annual methylene chloride ground level concentration will be discussed in Comment 2.

| Compound | Averaging Time | Revised Maximum ISCST2 Ground Level Concentration ($\mu g/m^3$) | FDEP AAAC ($\mu g/m^3$) |
|---|---|---|---|
| Methylene Chloride | 8-hour<br>24-hour | 1,538.9<br>250.8 | 1,740<br>417.6 |
| 1,1,1-Trichloroethane | 8-hour<br>24-hour | 10.1<br>6.7 | 38,200<br>9,168 |

The revised pages, based on the requested changes, of Volume I and Volume II: Dispersion Modeling Analysis of the permit application along with the output listings from the revised modeling analysis are attached.

The requested change in Specific Condition 1 is given below.

**From:**

1. The enhanced exhaust systems shall be completed by February 15, 1996. The systems shall include: two 2.8 ft. diameter by 125 ft. high stacks, each handling 30,000 acfm of air; seventeen roof exhaust fans with 3.6 ft. diameter 53 ft. high stacks, each handling 50,000 acfm of air; and two roof exhaust fans with 2 ft. diameter by 53 ft. high stacks, each handling 15,000 acfm of air. The two 125 ft. high stacks shall be equipped with stack sampling facilities meeting the specifications listed in Rule 62-297.345, F.A.C. Tank No. 10 shall be equipped with a pressure/vacuum relief valve.

**To:**

1. The enhanced exhaust systems shall be completed by February 15, 1996. The systems shall include: two 2.8 ft. diameter by 125 ft. high stacks, each handling 30,000 acfm of air; three roof exhaust fans with 3.6 ft. diameter 53 ft. high stacks, each handling 50,000 acfm of air; and two roof exhaust fans with 2 ft. diameter by 53 ft. high stacks, each handling 15,000 acfm of air. The two 125 ft. high stacks shall be equipped with stack sampling facilities

meeting the specifications listed in Rule 62-297.345, F.A.C. Tank No. 10 shall be equipped with a pressure/vacuum relief valve.

**COMMENT 2**

Foamex requests a change in the limits on the annual quantity of methylene chloride used at the facility stated in Specific Condition 2. An increase in the annual usage rate of methylene chloride from 513,090 lbs/yr (256.6 TPY) to 551,192 lbs/yr (275.6 TPY) is requested to maximize foam production without exceeding the FDEP annual AAAC for methylene chloride of 2.1 $\mu g/m^3$. The dispersion modeling analysis has been revised based on the requested increase in the annual methylene chloride usage limit and the requested change in the foam fabrication operations exhaust system as discussed in Comment 1. The requested annual increase only affects the annual average emission rates and does not affect the maximum hourly or daily emissions of methylene chloride. The results of the revised modeling analysis, presented below, show that the maximum annual ground level concentration for methylene chloride does not exceed the FDEP annual AAAC for methylene chloride.

| Compound | Averaging Time | Revised Maximum ISCST2 Ground Level Concentration ($\mu g/m^3$) | FDEP AAAC ($\mu g/m^3$) |
|---|---|---|---|
| Methylene Chloride | Annual | 2.09998 | 2.1 |

The revised pages, based on the requested change, of Volume I and Volume II: Dispersion Modeling Analysis of the permit application along with the output listings from the revised modeling analysis are attached.

The requested change in Specific Condition 2 is given below.

**From:**

2. The chemicals used at the facility shall not exceed the following quantities during any twelve month period: 513,090 lbs/yr (256.6 TPY) methylene chloride; 1,000,000 lbs/yr (500 TPY) polymer; 15,000,000 lbs/yr (7,500 TPY) polyol; and, 10,000,000 lbs/yr (5,000 TPY) toluene diisocyanate. Cleanup solvent losses shall not exceed: 20 gallons/month isopropyl alcohol; 5,770 lbs/yr 1,1,1-trichloroethane with silicone lubricant; and, 1,000 lbs/yr mineral spirits.

   Compliance with this condition shall be determined by records of purchases, inventory changes, and receipts for chemicals disposed of off site. The permittee shall maintain a log showing the amount of chemicals used each month to document compliance with these limitations.

**To:**

2. The chemicals used at the facility shall not exceed the following quantities during any twelve month period: 551,192 lbs/yr (275.6 TPY) methylene chloride; 1,000,000 lbs/yr (500 TPY) polymer; 15,000,000 lbs/yr (7,500 TPY) polyol; and, 10,000,000 lbs/yr (5,000 TPY) toluene diisocyanate. Cleanup solvent losses shall not exceed: 20 gallons/month isopropyl alcohol; 5,770 lbs/yr 1,1,1-trichloroethane with silicone lubricant; and, 1,000 lbs/yr mineral spirits.

   Compliance with this condition shall be determined by records of purchases, inventory changes, and receipts for chemicals disposed of off site. The permittee shall maintain a log showing the amount of chemicals used each month to document compliance with these limitations.

COMMENT 3

As a result of the requested increase in annual methylene chloride usage discussed in Comment 2 above, Foamex requests a modification of the estimated emissions stated in Specific Condition 4. The calculations supporting this change are provided in the attached revised pages of Volume I of the permit application. The requested change in Specific Condition 4 is given below.

**From:**

4. For inventory purposes, the estimated emissions from this facility (based on the emission factors listed in the application, the limitations on operation time, and chemical usage) are:

   AVERAGE EMISSIONS FROM FACILITY OPERATIONS:

| Chemicals | Emissions lbs/hr | TPY |
|---|---|---|
| methylene chloride | 2,222.43 | 261.03 |
| 1,1,1-trichloroethane | 2.5 | 1.86 |
| toluene diisocyanate | 0.3746 | 0.424 |

MAXIMUM POTENTIAL EMISSIONS FROM INDIVIDUAL OPERATIONS ARE ESTIMATED TO BE:

| | Operation/chemical | Emissions lbs/hr | Emissions TPY |
|---|---|---|---|
| I. | Slabstock Polyurethane Foam Production/ toluene diisocyanate | 0.37 | 0.404 |
| II. | Foam Line Stack/ methylene chloride | 1,400 | 153.93 |
| III. | Long Bun Storage Room Stack/ methylene chloride | 816.67 | 89.79 |
| IV. | Foam Fabrication Operations/ methylene chloride | 5.1 | 14.41 |
| | 1,1,1-trichloroethane | 2.5 | 1.86 |
| V. | Rebond Polyurethane Foam Production/ toluene diisocyanate | 0.0046 | 0.02 |
| VI. | Tank Storage (Tank No. 10)/ methylene chloride | 0.66 | 2.92 |
| VII. | Steam Boiler | Trace amounts of the normal products of combustion (less than 1 lb/hr of all pollutants) | |
| VIII. | Environmental Heating | Trace amounts of the normal products of combustion (less than 1 lb/hr of all pollutants) | |

**To:**

4. For inventory purposes, the estimated emissions from this facility (based on the emission factors listed in the application, the limitations on operation time, and chemical usage) are:

AVERAGE EMISSIONS FROM FACILITY OPERATIONS:

| Chemicals | Emissions lbs/hr | TPY |
|---|---|---|
| methylene chloride | 2,222.65 | 280.13 |
| 1,1,1-trichloroethane | 2.5 | 1.86 |
| toluene diisocyanate | 0.3746 | 0.424 |

MAXIMUM POTENTIAL EMISSIONS FROM INDIVIDUAL OPERATIONS ARE ESTIMATED TO BE:

| | Operation/chemical | Emissions lbs/hr | TPY |
|---|---|---|---|
| I. | Slabstock Polyurethane Foam Production/ toluene diisocyanate | 0.37 | 0.404 |
| II. | Foam Line Stack/ methylene chloride | 1,400 | 165.36 |
| III. | Long Bun Storage Room Stack/ methylene chloride | 816.67 | 96.46 |
| IV. | Foam Fabrication Operations/ methylene chloride | 5.32 | 15.39 |
| | 1,1,1-trichloroethane | 2.5 | 1.86 |
| V. | Rebond Polyurethane Foam Production/ toluene diisocyanate | 0.0046 | 0.02 |
| VI. | Tank Storage (Tank No. 10)/ methylene chloride | 0.66 | 2.92 |
| VII. | Steam Boiler | Trace amounts of the normal products of combustion (less than 1 lb/hr of all pollutants) | |
| VIII. | Environmental Heating | Trace amounts of the normal products of combustion (less than 1 lb/hr of all pollutants) | |

CLOSING

Should you require any additional information or have any questions regarding these issues please contact Kay Rykowski at (407)851-1484.

Yours very truly,

HARDING LAWSON ASSOCIATES

John Wolber
Project Scientist

Joseph L. Tessitore, P.E.
Managing Principal
State of Florida P.E. Registration Number 23374

JMW/JLT/jmw
26005W02.DOC/

Attachments:
A. Revised pages to Volume I of Original Permit Application
B. Revised pages to Volume II: Dispersion Modeling Analysis of Original Permit Application
C. Output Listings from Revised Modeling (Appendixes D, E, F, I, and J of Volume II of Original Permit Application)

cc: Mr. Doug Terrill, Foamex, L.P., Orlando, Florida
Mr. Tom Burghardt, Foamex, L.P., Linville, Pennsylvania

# Attachment A

## Revised Pages to Volume I of Original Permit Application

a conveyor. After exiting the tunnel the foam slab is cut into sections, referred to as buns. The buns continue down the conveyor and enter the Long Bun Storage Room. The foam continues to release methylene chloride as it travels down the conveyor to the Long Bun Storage Room. The buns are then removed from the conveyor and placed in the room for temporary storage during completion of a twelve hour cure period, continuing to release methylene chloride at a diminishing rate.

Currently, the Slabstock process is equipped with an exhaust system and tunnel which covers part of the mixing head, trough and conveyor line to vent the emissions which occur during the initial stages of the process. This system maintains a negative pressure along the covered portion of the process and vents the methylene chloride emissions to the atmosphere through an existing stack. Emissions of methylene chloride which occur outside of the foam line tunnel, inside the Long Bun Storage Room and in isolated areas of the facility during foam fabrication operations, are currently released into the interior of the facility and discharged to the atmosphere through general ventilation fans (50,000 CFM each) located in the ceiling throughout the facility.

The proposed enhanced collection system requires the complete enclosure of the mixing head, trough, and conveyor line in a tunnel. The foam line enclosure will extend from the mixing head to the Long Bun Storage Room. The system will be designed to maintain negative pressure within the foam line enclosure. The foam line enclosure exhaust will be vented to the atmosphere by a 30,000 CFM exhaust fan, or combination of fans totaling 30,000 CFM, via an exhaust stack with a height of 125 feet above ground level. In addition to the foam line enclosure, the proposed enhanced collection system requires the Long Bun Storage Room to be maintained under negative pressure and the exhaust vented to the atmosphere by a 30,000 CFM exhaust fan, or combination of fans totaling 30,000 CFM, via an exhaust stack with a height of 125 feet above ground level. As part the proposed system, the existing ceiling exhaust fans in the Long Bun Storage Room will not be operational. Emissions from foam fabrication operations, which do not occur within the foam line enclosure or Long Bun Storage Room, will be vented to the atmosphere through three 50,000 CFM general exhaust fans located in the ceiling in the areas of the facility isolated for foam fabrication operations. To provide enhanced dispersion, these three exhaust fans will be fitted with extensions to increase the their stack heights to 53 feet above ground level. As part of the proposed system the remaining fourteen ceiling exhaust fans not used as part of the foam fabrication operations exhaust system will not be operational.

Based on industry and product information, it is assumed for this permit application, that 60% of the methylene chloride is released from the foam in the foam line enclosure before it reaches the Long Bun Storage Room and 35% is released during the twelve hour cure period in the Long Bun Storage Room. The remaining 5% of the methylene chloride is released during subsequent foam fabrication and processing operations throughout the rest of the facility before shipment of the final product. Also, all TDI emissions associated with the Slabstock production occur within the foam line enclosure and are emitted to the atmosphere via the foam line stack.

### 2.2.2 Rebond Polyurethane Foam Production

In the Rebond process, scrap polyurethane foam, either purchased or recovered from the slabstock manufacturing process, is granulated into small pieces approximately 3/4 to one inch in size. This granulated foam is stored by grade, density, and/or by composition in large storage bins. The scrap pieces of polyurethane foam are mixed with an adhesive binder in a blend tank. The binder is a mixture of TDI and polyol. The mixture of scrap foam and binder is then transferred from the blend tank to the mold where it is

compressed under an air cylinder to a designated size. The product is steamed from the bottom of the mold, which cures the foam . The resulting cylinder of foam is referred to as a log. The foam log is then peeled into a continuous sheet with a thickness of 1/4 to 3/4 inch, per customer specifications. The foam sheet product is then bonded to a polyethylene film. Finally the foam sheet product is cut to length and packaged into rolls, per customer order.

The TDI emissions from the Rebond process are currently vented to the atmosphere through two identical 1,000 CFM exhaust fans located in the ceiling directly above the process. These two exhaust fans will be increased in size to 15,000 CFM each and will be fitted with extensions to increase the their stack heights to 53 feet above ground level.

### 2.2.3 Tank Storage

The Foamex facility includes eleven above ground storage tanks for receiving and holding of the various raw materials used in the foam production processes. Table 3.3 provides a summary of the tanks, dimensions and products stored. Only one tank, Tank 10, is used for storage of methylene chloride. Foamex proposes to install a pressure relief valve on Tank 10 to minimize standing losses of methylene chloride. No physical or operational changes to the remaining storage tanks are proposed.

### 2.2.4 Steam Boiler

Foamex operates a natural gas fired industrial boiler rated at 100 HP. This boiler is used to convert an average of 1,570 gallons of water to steam each day for use in the Rebond process. No changes to the operation of the steam boiler are proposed.

### 2.2.5 Environmental Heating

There are thirteen indirect natural gas fired heaters existing at the Foamex facility. Of these, nine are used as needed during the winter months for heating the manufacturing and administrative areas of the facility. It is estimated that these heaters operate less than 400 hours per year. The remaining four heaters are not operational. Table 3.4 provides a listing of the individual heaters and the rated capacity of each heater.

### 2.2.6 Foam Fabrication Operations

During foam fabrication operations, the foam buns manufactured during the Slabstock process are cut to size, assembled, and glued according to customer specifications. The fabrication operations take place only in those areas of the facility isolated for foam fabrication operations. Approximately 3.1 lbs/hr of glue is used during these operations. Foamex primarily uses methylene chloride based glue in the foam fabrication operations, but may also occasionally use 1,1,1-trichloroethane based glue. The methylene chloride based glue has a maximum methylene chloride content of 70% by weight. The 1,1,1-trichloroethane based glue has a maximum concentration of 1,1,1-trichloroethane of 81% by weight. The emissions from the gluing process are vented to the atmosphere through the three ceiling exhaust fans located in the areas isolated for foam fabrication operations, which will be modified as part of the proposed enhanced collection and dispersion system as described in Section 2.2.1.

## 2.3 Requested Permitted Operating Time

For the processes and supporting operations discussed above, the requested hours of operation in the permit application are as follows:

- Slabstock Polyurethane Foam Production: 6 hrs/day; 7 days/wk; 52 wks/yr;
- Rebond Polyurethane Foam Production: 24 hrs/day, 7 days/wk, 52 wks/yr;
- Tank Storage: 24 hrs/day, 7 days/wk, 52 wks/yr;
- Steam Boiler: 24 hrs/day, 7 days/wk, 52 wks/yr;
- Environmental Heating: 400 hrs/yr; and
- Foam Fabrication Operations: 24 hrs/day, 7 days/wk, 52 wks/yr.

**Table 2.1. Summary of Emission Sources**
**Foamex, L.P. - Orlando, Florida**

| Process Emission Source | Emission Point Number | Description |
|---|---|---|
| Slabstock Polyurethane Foam Production | 1 | Foam Line Stack |
| Slabstock Polyurethane Foam Production | 2 | Long Bun Storage Room Stack |
| Not operational as part of enhanced exhaust system | 3 | Exhaust Fan |
| Not operational as part of enhanced exhaust system | 4 | Exhaust Fan |
| Not operational as part of enhanced exhaust system | 5 | Exhaust Fan |
| Not operational as part of enhanced exhaust system | 6 | Exhaust Fan |
| Slabstock Foam Production/Foam Fabrication Operations | 7 | Exhaust Fan |
| Not operational as part of enhanced exhaust system | 8 | Exhaust Fan |
| Not operational as part of enhanced exhaust system | 9 | Exhaust Fan |
| Not operational as part of enhanced exhaust system | 10 | Exhaust Fan |
| Not operational as part of enhanced exhaust system | 11 | Exhaust Fan |
| Slabstock Foam Production/Foam Fabrication Operations | 12 | Exhaust Fan |
| Not operational as part of enhanced exhaust system | 13 | Exhaust Fan |
| Not operational as part of enhanced exhaust system | 14 | Exhaust Fan |
| Not operational as part of enhanced exhaust system | 15 | Exhaust Fan |
| Not operational as part of enhanced exhaust system | 16 | Exhaust Fan |
| Not operational as part of enhanced exhaust system | 17 | Exhaust Fan |
| Not operational as part of enhanced exhaust system | 18 | Exhaust Fan |
| Slabstock Foam Production/Foam Fabrication Operations | 19 | Exhaust Fan |
| Rebond Polyurethane Foam Production | 20 | Rebond Exhaust Fan |
| Rebond Polyurethane Foam Production | 21 | Rebond Exhaust Fan |
| Tank Storage | 22 | Tank #10 |
| Steam Boiler | 23 | Boiler Stack |
| Environmental Heating | 24 | Natural Gas Heaters |

To calculate the maximum hourly usage rate of methylene chloride it is necessary to define the "worst case" maximum daily usage of methylene chloride. The "worst case" maximum daily methylene chloride usage is 14,000 lb/day.

The maximum hourly usage rate of methylene chloride is then calculated as follows:

Maximum hourly usage = 14,000 lb/day ÷ 6 hr/day = 2,333.33 lb/hr

The maximum annual usage of methylene chloride at the facility will be limited to 551,192 lbs/yr.

### 3.1.2 Rebond Polyurethane Foam Production

A summary of the typical material input and production rates for the Rebond process are provided in Table 3.2.

**Table 3.2. Rebond Polyurethane Foam Production Process Rates**
**Foamex, L.P. - Orlando, Florida**

| Substance | Process Input Rate (lbs/hr) | Production Rate (lbs/hr) |
|---|---|---|
| Raw Materials: | | |
| Scrap Foam | 5,608 | 0 |
| Polyol | 459 | 0 |
| TDI | 164 | 0 |
| Product: | | |
| Rebond Foam Product | 0 | 6,231 |

### 3.1.3 Tank Storage

As stated previously in Section 2.2.3 of this application, the Foamex facility includes eleven above ground storage tanks. The current estimated maximum annual material throughput for each tank is shown in Table 3.3 below.

**Table 3.3. Tanks Storage Process Rates**
**Foamex, L.P. - Orlando, Florida**

| Tank Number | Product | Height (feet) | Diameter (feet) | Throughput (lbs/yr) |
|---|---|---|---|---|
| 1 | Polyol | 35 | 12 | Note 1 |
| 2 | Polyol | 35 | 12 | Note 1 |
| 3 | TDI | 35 | 12 | Note 2 |
| 4 | Polyol | 35 | 12 | Note 1 |
| 5 | Polyol | 35 | 12 | Note 1 |
| 6 | TDI | 35 | 12 | Note 2 |
| 7 | Empty | 16 | 10.5 | 0 |
| 8 | Polymer | 16 | 10.5 | 1,000,000 |
| 9 | Empty | 35 | 12 | 0 |
| 10 | Methylene Chloride | 37 (long) | 7 | 551,192 |
| 11 | Empty | 30 (long) | 7 | 0 |

Note 1: Total Polyol Throughput = 15,000,000 lbs/yr
Note 2: Total TDI Throughput = 10,000,000 lbs/yr

### 3.1.4 Steam Boiler

The industrial boiler used for steam production is rated at 100 hp and is fired by natural gas. The boiler is used to convert an average of 1,570 gallons of water to steam each day for the Rebond process. The maximum heat input for the boiler is 4.2 mmBtu/hr with a maximum natural gas consumption rate of 4,200 cf/hr. The maximum operating schedule for the boiler is 8760 hrs/yr.

### 3.1.5 Environmental Heating

There are thirteen indirect natural gas fired heaters at the Foamex facility. Of these, nine are used as needed during the winter months for heating the manufacturing and administrative areas of the facility. It is estimated that these heaters operate less than 400 hours per year. The total maximum heat input for the heaters is 1.85 mmBtu/hr, with a maximum natural gas usage rate of 1850 cf/hr. On an average basis, the natural gas usage rate is 200 cf/hr. Table 3.4 provides a listing of the individual heaters and heat input rates.

**Table 3.4. Indirect Fired Heaters Process Rates**
**Foamex, L.P. - Orlando, Florida**

| Heater Number | Manufacturer | Model Number | Operational? | Maximum Heat Input (Btu/hr) |
|---|---|---|---|---|
| 1 | Bryant | 200-341 | Yes | 200,000 |
| 2 | Bryant | 200-341 | No | 200,000 |
| 3 | Hastings | GF200XE | Yes | 200,000 |
| 4 | Hastings | GF200XE | No | 200,000 |
| 5 | Hastings | GF200XE | Yes | 200,000 |
| 6 | Hastings | GF200XE | Yes | 200,000 |
| 7 | Hastings | GF200XE | Yes | 200,000 |
| 8 | Hastings | GF200XE | Yes | 200,000 |
| 9 | Hastings | GF200XE | Yes | 200,000 |
| 10 | Hastings | GF200XE | Yes | 200,000 |
| 11 | Bryant | 200-341 | No | 200,000 |
| 12 | Bryant | 200-341 | No | 200,000 |
| 13 | Peereless | 1067 | Yes | 250,000 |
| TOTAL (operational heaters only) | | | | 1,850,000 |

### 3.1.6 Foam Fabrication Operations

During Foam Fabrication Operations, the foam buns manufactured during the Slabstock process are cut and glued according to customer specifications. Approximately 3.1 lbs/hr of glue is used during these operations. The maximum annual usage rate of glue at the facility is 4,600 lb/yr, or 2.3 tons/yr.

## 3.2 Emissions Calculations

### 3.2.1 Slabstock Polyurethane Foam Production

#### 3.2.1.1 Methylene Chloride

As stated in Section 3.1.1 of this application, methylene chloride represents the only significant emissions associated with this process. Currently, it is the only blowing agent used. In this process, all of the blowing agent used is emitted to the atmosphere and does not end up in the foam product. Based on industry and product information, it is assumed for this permit application, that 60% of the methylene chloride is released from the foam in the foam line enclosure before it reaches the Long Bun Storage Room and 35% is released during the twelve hour cure period in the Long Bun Storage Room. The remaining 5% of the methylene chloride is released during subsequent foam fabrication operations prior to shipment of the final product. The total uncontrolled process emissions of methylene chloride on an annual basis can, therefore, be estimated directly from the annual methylene chloride usage rate in Section 3.1.1.

Maximum annual methylene chloride usage = 551,192 lbs/yr

Maximum annual methylene chloride emissions = 551,192 lbs/yr ÷ 2,000 lbs/ton
= 275.6 tons/yr

The values shown above represent the total methylene chloride emissions from the slabstock foam production process. However, these emissions are distributed between each of the two stacks serving the process, the Foam Line Stack and the Long Bun Storage Room Stack, and the three exhaust ceiling exhaust fans serving the Foam Fabrication Operations area. Both short term and long term emission rates must be calculated for the Foam Line Stack and Long Bun Storage Room Stack. Emissions calculations for the Foam Fabrication Operations are included under that heading in Section 3.2.6. Long term or annual emissions from the Foam Line and Long Bun Storage Room can be calculated by multiplying the distribution factors for each (60% and 35%, respectively) by the total maximum annual emissions specified above.

Foam Line Stack:

Maximum annual methylene chloride emissions = 551,192 lbs/yr x 0.60
= 330,715.2 lb/yr

Maximum annual methylene chloride emissions = 330,715.2 lbs/yr ÷ 2,000 lbs/ton
= 165.36 tons/yr

Long Bun Storage Room Stack:

Maximum annual methylene chloride emissions = 551,192 lbs/yr x 0.35
= 192,916.85 lb/yr

Maximum annual methylene chloride emissions = 192,916.85 lbs/yr ÷ 2,000 lbs/ton
= 96.46 tons/yr

The first step in developing an estimate of the maximum hourly emission rate for the Foam Line and Long Bun Storage Room is to define the "worst case" maximum daily methylene chloride usage. For this purpose, the "worst case" daily usage of methylene chloride, as defined in Section 3.1.1 of this application, is 14,000 lbs/day over six hours of operation (2,333.33 lb/hr). Assuming that 60% of this quantity is released during the pour period in the foam line enclosure as the foam travels along the process line conveyor before it reaches the Long Bun Storage Room, the Foam Line Stack emits a total of 8,400 pounds of methylene chloride over the six hour pour period. As the buns enter the Long Bun Storage Room, the remaining methylene chloride which is contained in the foam material begins to be released. Assuming that 35% of the methylene chloride used during the pour is released in the Long Bun Storage Room during the cure period, a total of 4,900 pounds of methylene chloride is emitted from the Long Bun Storage Room Stack. The 5% (700 pounds) of the methylene chloride remaining after the cure period in the foam product after it is removed from the Long Bun Storage Room is emitted during the foam fabrication operations through the three ceiling exhaust fans located in the foam fabrication areas.

As stated previously, the Long Bun Storage Room emissions decay at an exponential rate over the foam cure period. Appendix A provides a detailed analysis of the actual emission rate profile for the Long Bun Storage Room. However, for emission calculation purposes, a more simple approach representing a worst case scenario is used. This approach ignores the decay profile and the foam cure period and instead assumes that the total quantity of emissions is released at a steady rate during the pour period only. Because the length of the pour period is shorter than the cure period, the resulting maximum short term emission rate is higher. Thus, this approach represents a worst case scenario. The following provides a simple summary of this mass balance.

| | |
|---|---|
| Maximum methylene chloride usage | = 14,000 lbs |
| Maximum Foam Line Stack methylene chloride emissions | = 8,400 lbs |
| Maximum Long Bun Storage Room Stack methylene chloride emissions | = 4,900 lbs |
| Maximum methylene chloride emissions from three exhaust fans | = 700 lbs |
| Maximum Total methylene chloride emissions | = 14,000 lbs |

Using the worst case assumption that the total emissions for both the Foam Line Stack and Long Bun Storage Room Stack occur during the six hour pour period, the maximum hourly emission rates are calculated as follows:

Foam Line Stack:

Maximum hourly methylene chloride emissions = 8,400 lbs ÷ 6 hrs
= 1,400 lb/hr

Long Bun Storage Room Stack:

Maximum hourly methylene chloride emissions = 4,900 lbs ÷ 6 hrs
= 816.67 lb/hr

As stated above, emissions from the three exhaust fans during foam fabrication operations are included under the heading Foam Fabrication Operations in Section 3.2.6.

### 3.2.1.2 Toluene Diisocyanate

As stated above, the Slabstock process involves the mixture of various process chemicals along with an auxiliary blowing agent to produce polyurethane foam. The calculations presented above provide an estimate of the emissions of the auxiliary blowing agent, methylene chloride. All of the methylene chloride used is volatilized and thus emitted from the process. The remaining process chemicals listed in the mass balance, shown in Section 3.1.1, combine to form the foam product. In 1991, Foamex conducted a stack test for emissions of methylene chloride and toluene diisocyanate (TDI). The test results, included in Appendix B, revealed that a small quantity of TDI is emitted from the process. Table 3.5 provides a summary of the test results.

version 1.0, which is based on the calculation procedures specified in AP-42 section 12. The calculations were conducted based on the maximum annual methylene chloride throughput for the facility of 551,192 lb/yr. The calculations represented in Appendix C were conducted based on the existing tank design, which includes a breather vent with no pressure setting. Thus breathing losses, also referred to as standing losses, are not limited in any way. The following provides a summary of the results of the calculations. However Foamex proposes to install a pressure relief vent for this tank such that standing losses would be minimized.

| | | |
|---|---|---|
| Total standing losses | = | 4992.73 lbs/yr |
| Total working losses | = | 844.16 lbs/yr |
| Maximum annual emissions | = | (4992.73 lbs/yr) + (844.16 lbs/yr) |
| | = | 5836.89 lbs/yr |
| | = | (5836.89 lbs/yr) ÷ (2000 lbs/ton) |
| | = | 2.9 tons/yr |
| Annual average emission rate | = | (5836.89 lbs/yr) ÷ (8760 hrs/yr) |
| | = | 0.66 lbs/hr |

### 3.2.4 Steam Boiler

Emissions from the Steam Boiler are generated through natural gas combustion. Appendix D provides calculations of the fuel combustion emissions based on the procedures specified in AP-42 section 1.4. A copy of this AP-42 section is also included in Appendix D. Table 3.6 provides a summary of the results of these calculations.

**Table 3.6. Steam Boiler Emission Rates**
**Foamex, L.P. - Orlando, Florida**

| Compound | Maximum Hourly Emission Rate (lbs/hr) | Maximum Annual Emissions (tons/yr) |
|---|---|---|
| Particulate | 0.021 | 0.092 |
| Sulfur dioxide | 0.0025 | 0.011 |
| Nitrogen oxide | 0.59 | 2.58 |
| Carbon monoxide | 0.147 | 0.64 |
| Total hydrocarbons | 0.013 | 0.055 |

### 3.2.5 Environmental Heating

Emissions from Environmental Heating are generated through natural gas combustion. Appendix E provides calculations of the fuel combustion emissions based on the procedures specified in AP-42 section 1.4. A copy of this AP-42 section is also included in Appendix D. Table 3.7 provides a summary of the results of these calculations.

**Table 3.7. Environmental Heating Emission Rates**
**Foamex, L.P. - Orlando, Florida**

| Compound | Maximum Hourly Emission Rate (lbs/hr) | Maximum Annual Emissions (tons/yr) |
|---|---|---|
| Particulate | 0.00925 | 0.00185 |
| Sulfur dioxide | 0.00111 | 0.000222 |
| Nitrogen oxide | 0.259 | 0.0518 |
| Carbon monoxide | 0.06475 | 0.01295 |
| Total hydrocarbons | 0.00555 | 0.00111 |

### 3.2.6 Foam Fabrication Operations

#### 3.2.6.1 Methylene Chloride

As stated above, after the foam bun cure period ends 5% of the total methylene chloride used is still retained in the foam buns. This quantity is not released until the buns leave the Long Bun Storage Room and are cut or processed during Foam Fabrication operations. This remaining 5% is emitted from the foam into the areas isolated for foam fabrication operations and discharged to the atmosphere through the three ceiling exhaust fans located in these areas. Further, since an inventory of foam product is always present in the foam fabrication areas, these emissions are released at a constant rate throughout the year. The maximum annual emissions and maximum hourly emission rates for these emissions from the three foam fabrication operations exhaust fans are calculated as follows.

Maximum annual emissions = 551,192 lbs/yr x 0.05
= 27,559.6 lbs/yr
= 13.78 tons/yr

Maximum hourly emissions = 27,559.6 lbs/yr ÷ 8,760 hr/yr
= 3.15 lb/hr

In the gluing process Foamex uses a methylene chloride based glue, therefore, methylene chloride emissions must be calculated for the gluing process. In section 3.1.6, the annual and hourly usage rates of glue used in these operations are presented. Based on the Material Safety Data Sheet (MSDS) for this glue, the maximum methylene chloride content of the glue is 70% by weight. Copies of relevant MSDS are provided in Appendix F. Using the glue usage rates of 3.1 lbs/hr and 4,600 lb/yr the methylene chloride emissions are calculated as follows:

Maximum hourly emissions = 3.1 lbs/hr x 0.70
= 2.17 lbs/hr

Maximum annual emissions = 4,600 lbs/yr x 0.70 ÷ 2,000 lbs/ton
= 1.61 tons/yr

The total methylene chloride emissions from the foam fabrication operations are calculated as follows:

Maximum hourly emissions = 3.15 lb/hr + 2.17 lbs/hr

= 5.32 lbs/hr

Maximum annual emissions = 13.78 tons/yr + 1.61 tons/yr
= 15.39 tons/yr

### 3.2.6.2 1,1,1-Trichloroethane

In the gluing process Foamex may also use a 1,1,1-trichloroethane based glue, therefore, 1,1,1-trichloroethane emissions must be calculated for the gluing process. In section 3.1.6, the annual and hourly usage rates of glue used in these operations are presented. Based on the Material Safety Data Sheet (MSDS) for this glue, the maximum 1,1,1-trichloroethane content of the glue is 81% by weight. Copies of relevant MSDS are provided in Appendix F. Using the glue usage rates of 3.1 lbs/hr and 4,600 lb/yr the 1,1,1-trichloroethane emissions are calculated as follows:

Maximum hourly emissions = 3.1 lbs/hr x 0.81
= 2.5 lbs/hr

Maximum annual emissions = 4,600 lbs/yr x 0.81 ÷ 2,000 lbs/ton
= 1.86 tons/yr

## 3.2.7 Emissions Summary

A summary of the maximum hourly and annual emission rates for each process is provided in Table 3.8. Emission rates calculated on an 8-hour average and 24-hour average are also provided in Volume II of this application, the Dispersion Modeling Analysis, which is submitted under separate cover.

## Table 3.8. Emissions Summary
## Foamex, L.P. - Orlando Facility

| Contaminant | Emission Source | Emissions[1] Maximum (lbs/hr) | Emissions[1] Actual (T/yr) | Allowed[2] Emission Rate per Rule 17-2 | Allowable[3] Emissions (lbs/hr) | Potential[4] Emissions (lbs/hr) | Potential[4] Emissions (T/yr) |
|---|---|---|---|---|---|---|---|
| Methylene Chloride | Slabstock Process | 2216.67 | 261.82 | N/A | N/A | 2216.67 | 261.82 |
| | Tank Storage | 0.66 | 2.92 | N/A | N/A | 0.66 | 2.92 |
| | Foam Fabrication | 5.32 | 15.39 | N/A | N/A | 5.32 | 15.39 |
| | Subtotal | 2222.65 | 280.13 | N/A | N/A | 2222.65 | 280.13 |
| 1,1,1-Trichloroethane | Foam Fabrication | 2.5 | 1.86 | N/A | N/A | 2.5 | 1.86 |
| | Subtotal | 2.5 | 1.86 | N/A | N/A | 2.5 | 1.86 |
| Toluene Diisocyanate | Slabstock Process | 0.37 | 0.404 | N/A | N/A | 0.37 | 0.404 |
| | Rebond Process | 0.0046 | 0.02 | N/A | N/A | 0.0046 | 0.02 |
| | Subtotal | 0.3746 | 0.424 | N/A | N/A | 0.3746 | 0.424 |
| Particulate | Steam Boiler | 0.021 | 0.092 | N/A | N/A | 0.021 | 0.092 |
| | Environmental Heating | 0.00925 | 0.00185 | N/A | N/A | 0.00925 | 0.00185 |
| | Subtotal | 0.03025 | 0.09385 | N/A | N/A | 0.03025 | 0.09385 |
| Sulfur Dioxide | Steam Boiler | 0.0025 | 0.011 | N/A | N/A | 0.0025 | 0.011 |
| | Environmental Heating | 0.00111 | 0.000222 | N/A | N/A | 0.00111 | 0.000222 |
| | Subtotal | 0.00361 | 0.011222 | N/A | N/A | 0.00361 | 0.011222 |
| Nitrogen Oxides | Steam Boiler | 0.59 | 2.58 | N/A | N/A | 0.59 | 2.58 |
| | Environmental Heating | 0.259 | 0.0518 | N/A | N/A | 0.259 | 0.0518 |
| | Subtotal | 0.849 | 2.6318 | N/A | N/A | 0.849 | 2.6318 |
| Carbon Monoxide | Steam Boiler | 0.147 | 0.64 | N/A | N/A | 0.147 | 0.64 |
| | Environmental Heating | 0.06475 | 0.01295 | N/A | N/A | 0.06475 | 0.01295 |
| | Subtotal | 0.21175 | 0.65295 | N/A | N/A | 0.21175 | 0.65295 |
| Total Hydrocarbons | Steam Boiler | 0.013 | 0.055 | N/A | N/A | 0.013 | 0.055 |
| | Environmental Heating | 0.00555 | 0.00111 | N/A | N/A | 0.00555 | 0.00111 |
| | Subtotal | 0.01855 | 0.05611 | N/A | N/A | 0.01855 | 0.05611 |

1. See Section V, Item 2 (Application Section 3.2).
2. Reference applicable emission standards and units (e.g. Rule 17-2.6000(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input).
3. Calculated from operating data and applicable standard.
4. Emission, if source operated without control (See Section V, Item 3).

## 3.3 Emission Stack Data

Table 3.9 provides a summary of the geometry and flow characteristics for each stack located at the Foamex, L.P. facility.

**Table 3.9. Stack and Exhaust Fan Stack Parameters**
**Foamex, L.P. - Orlando, Florida**

| Source Number | Description | Stack Height[a] Above Ground Level (feet) | Stack Inside Diameter (inches) | Stack Gas Flow Rate (ACFM) | Stack Gas Exit Temp. (°F) | Stack Gas Exit Velocity (ft/sec) | Water Vapor Content |
|---|---|---|---|---|---|---|---|
| 1 | Foam Line Stack | 125 | 33.75 | 30,000 | 80 | 80.481 | Ambient |
| 2 | Long Bun Storage Room Stack | 125 | 33.75 | 30,000 | 80 | 80.481 | Ambient |
| 3 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | |
| 4 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | |
| 5 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | |
| 6 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | |
| 7 | Exhaust Fan | 53 | 43.5 | 50,000 | 80 | 80.744 | Ambient |
| 8 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | |
| 9 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | |
| 10 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | |
| 11 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | |
| 12 | Exhaust Fan | 53 | 43.5 | 50,000 | 80 | 80.744 | Ambient |
| 13 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | |
| 14 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | |
| 15 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | |
| 16 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | |
| 17 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | |
| 18 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | |
| 19 | Exhaust Fan | 53 | 43.5 | 50,000 | 80 | 80.744 | Ambient |
| 20 | Rebond Exhaust Fan | 53 | 24 | 15,000 | 80 | 79.577 | Ambient |
| 21 | Rebond Exhaust Fan | 53 | 24 | 15,000 | 80 | 79.577 | Ambient |

a. Elevation of top of stack above ground level. Stack base elevation = 0 feet.

## Attachment B

## Revised Pages to Volume II: Dispersion Modeling Analysis of Original Permit Application

## 2.0 PROJECT DESCRIPTION

Two basic processes are used at the Foamex facility to manufacture polyurethane foam product: Slabstock Polyurethane Foam Production and Rebond Polyurethane Foam Production. These processes are used to manufacture foam products of various density, color and thickness. While the basic processes remain the same, the proportions of raw materials are modified slightly for each batch to achieve the desired product specifications. In addition to the two manufacturing processes, support operations at the facility include tank storage of process chemicals, steam boiler operation, environmental heating, and foam fabrication operations.

### 2.1 Slabstock Polyurethane Foam Production

In the Slabstock process, a high pressure mixing head and metering pumps are used to mix the specific raw materials required for each product. These raw materials include toluene diisocyanate (TDI), polyol, water, catalysts, surfactants, additives (such as pigments or flame retardants), and methylene chloride, an auxiliary blowing agent. The mixed raw materials are discharged into a trough where the mixture begins to react and flows down a tunnel area. Heat generated by the exothermic reaction volatilizes the methylene chloride thus allowing the foam to reach a predetermined density. The foam begins releasing methylene chloride at this point. The methylene chloride serves to reduce the foam density, or soften it, and to provide cooling of the mixture as it discharges energy during the exothermic reaction. The foam slab travels through the tunnel via a conveyor. After exiting the tunnel the foam slab is cut into sections, referred to as buns. The buns continue down the conveyor and enter the Long Bun Storage Room. The foam continues to release methylene chloride as it travels down the conveyor to the Long Bun Storage Room. The buns are then removed from the conveyor and placed in the room for temporary storage during completion of a twelve hour cure period, continuing to release methylene chloride at a diminishing rate.

Currently, the Slabstock process is equipped with an exhaust system and tunnel which covers part of the mixing head, trough and conveyor line to vent the emissions which occur during the initial stages of the process. This system maintains a negative pressure along the covered portion of the process and vents the methylene chloride emissions to the atmosphere through an existing stack. Emissions of methylene chloride which occur outside of the foam line tunnel, inside the Long Bun Storage Room and in isolated areas of the facility during foam fabrication operations, are currently released into the interior of the facility and discharged to the atmosphere through general ventilation fans (50,000 CFM each) located in the ceiling throughout the facility.

The proposed enhanced collection system requires the complete enclosure of the mixing head, trough, and conveyor line in a tunnel. The foam line enclosure will extend from the mixing head to the Long Bun Storage Room. The system will be designed to maintain negative pressure within the foam line enclosure. The foam line enclosure exhaust will be vented to the atmosphere by a 30,000 CFM exhaust fan, or combination of fans totaling 30,000 CFM, via an exhaust stack with a height of 125 feet above ground level. In addition to the foam line enclosure, the proposed enhanced collection system requires the Long Bun Storage Room to be maintained under negative pressure and the exhaust vented to the atmosphere by a 30,000 CFM exhaust fan, or combination of fans totaling 30,000 CFM, via an exhaust stack with a height of 125 feet above ground level. As part the proposed system, the existing ceiling exhaust fans in the Long Bun Storage Room will not be operational. Emissions from foam fabrication operations, which do not occur within the foam line enclosure or Long Bun Storage Room, will be vented to the atmosphere through three

50,000 CFM general exhaust fans located in the ceiling in the areas of the facility isolated for foam fabrication operations. To provide enhanced dispersion, these three exhaust fans will be fitted with extensions to increase the their stack heights to 53 feet above ground level. As part of the proposed system the remaining fourteen ceiling exhaust fans not used as part of the foam fabrication operations exhaust system will not be operational.

Based on industry and product information, it is assumed for this analysis and the permit application, that 60% of the methylene chloride is released from the foam in the foam line enclosure before it reaches the Long Bun Storage Room and 35% is released during the twelve hour cure period in the Long Bun Storage Room. The remaining 5% of the methylene chloride is released during subsequent foam fabrication operations prior to shipment of the final product. Also, all TDI emissions associated with the Slabstock production occur within the foam line enclosure and are emitted to the atmosphere via the foam line stack.

## 2.2 Rebond Polyurethane Foam Production

In the Rebond process, scrap polyurethane foam, either purchased or recovered from the slabstock manufacturing process, is granulated into small pieces approximately 3/4 to one inch in size. This granulated foam is stored by grade, density, and/or by composition in large storage bins. The scrap pieces of polyurethane foam are mixed with an adhesive binder in a blend tank. The binder is a mixture of TDI and polyol. The mixture of scrap foam and binder is then transferred from the blend tank to the mold where it is compressed under an air cylinder to a designated size. The product is steamed from the bottom of the mold, which cures the foam . The resulting cylinder of foam is referred to as a log. The foam log is then peeled into a continuous sheet with a thickness of 1/4 to 3/4 inch, per customer specifications. The foam sheet product is then bonded to a polyethylene film. Finally the foam sheet product is cut to length and packaged into rolls, per customer order.

The TDI emissions from the Rebond process are currently vented to the atmosphere through two identical 1,000 CFM exhaust fans located in the ceiling directly above the process. These two exhaust fans will be increased in size to 15,000 CFM each and will be fitted with extensions to increase the their stack heights to 53 feet above ground level.

## 2.3 Tank Storage

The Foamex facility includes eleven above ground storage tanks for receiving and holding of the various raw materials used in the foam production processes. Table 1 provides a summary of the tanks, dimensions and products stored. Only one tank, Tank 10, is used for storage of methylene chloride. Methylene chloride emissions from Tank 10 were calculated using EPA's Storage Tank Emissions Calculation program, TANKS version 1.0, and are presented in the permit application. Foamex proposes to install a pressure relief valve on Tank 10 to minimize standing losses of methylene chloride. No physical or operational changes to the remaining storage tanks are proposed. Based on previous submittals to FDEP, methylene chloride emissions from Tank 10 are not addressed in this dispersion modeling analysis.

## 2.4 Steam Boiler

Foamex operates a natural gas fired industrial boiler rated at 100 HP. This boiler is used to convert an average of 1,570 gallons of water to steam each day for use in the Rebond process. No changes to the

operation of the steam boiler are proposed. Emissions from the steam boiler are not addressed in this dispersion modeling analysis.

## 2.5 Environmental Heating

There are thirteen indirect natural gas fired heaters existing at the Foamex facility. Of these, nine are used as needed during the winter months for heating the manufacturing and administrative areas of the facility. It is estimated that these heaters operate less than 400 hours per year. The remaining four heaters are not operational. Table 2 provides a listing of the individual heaters and the rated capacity of each heater. Emissions from the heaters are not addressed in this dispersion modeling analysis.

## 2.6 Foam Fabrication Operations

During foam fabrication operations, the foam buns manufactured during the Slabstock process are cut to size, assembled, and glued according to customer specifications. The fabrication operations take place only in those areas of the facility isolated for foam fabrication operations. Approximately 3.1 lbs/hr of glue is used during these operations. Foamex primarily uses methylene chloride based glue in the foam fabrication operations, but may also occasionally use 1,1,1-trichloroethane based glue. The methylene chloride based glue has a maximum methylene chloride content of 70% by weight. The 1,1,1-trichloroethane based glue has a maximum concentration of 1,1,1-trichloroethane of 81% by weight. The emissions of methylene chloride and 1,1,1-trichloroethane from the gluing process are analyzed in this dispersion modeling analysis. The emissions from the gluing process are vented to the atmosphere through the three ceiling exhaust fans located in areas isolated for foam fabrication operations, which will be modified as part of the proposed enhanced collection and dispersion system as described in Section 2.1.

## 2.7 Requested Permitted Operating Time

For the processes and supporting operations discussed above, the requested hours of operation in the permit application are as follows:

- Slabstock Polyurethane Foam Production: 6 hrs/day; 7 days/wk; 52 wks/yr;
- Rebond Polyurethane Foam Production: 24 hrs/day, 7 days/wk, 52 wks/yr;
- Tank Storage: 24 hrs/day, 7 days/wk, 52 wks/yr;
- Steam Boiler: 24 hrs/day, 7 days/wk, 52 wks/yr;
- Environmental Heating: 400 hrs/yr; and
- Foam Fabrication Operations: 24 hrs/day, 7 days/wk, 52 wks/yr.

## 3.0 DISPERSION MODELING METHODOLOGY

As previously stated, the dispersion modeling analysis presented in this report only addresses the following emissions from the Foamex facility:

- Methylene Chloride from the slabstock foam manufacturing process and from the gluing process during foam fabrication operations;
- Toluene Diisocyanate from the slabstock foam manufacturing process and rebond foam manufacturing process; and
- 1,1,1-Trichloroethane from the gluing process during foam fabrication operations.

The methodology followed in the dispersion modeling analysis is as follows:

1) A downwash/Good Engineering Practice (GEP) stack height analysis was conducted utilizing EPA's new Building Profile Input Program (BPIP), dated 94074.
2) Emission rates for each compound and process were calculated based on maximum daily and annual usage of each compound.
3) The EPA Industrial Source Complex - Short Term model (ISCST2), dated 93109, was used to predict the 8-hour and 24-hour impacts of each compound and annual impacts of methylene chloride from the facility.
4) The resulting concentrations were then compared with FDEP's AAAC's for each compound to determine if they are below the AAAC's.

## 4.0 SOURCE DATA

The source data used in the dispersion modeling analysis are presented in Table 3 below. The location of each source is shown in Figure 2.

**Table 3. Stack and Exhaust Fan Stack Parameters**
**Foamex, L.P. - Orlando, Florida**

| Source Number | Description | Stack Height[a] Above Ground Level (feet) | Stack Inside Diameter (inches) | Stack Gas Flow Rate (ACFM) | Stack Gas Exit Temp. (°F) | Stack Gas Exit Velocity (ft/sec) | Stack Location Coordinates[b] (feet) East | North |
|---|---|---|---|---|---|---|---|---|
| 1 | Foam Line Stack | 125 | 33.75 | 30,000 | 80 | 80.481 | 577 | 393 |
| 2 | Long Bun Storage Room Stack | 125 | 33.75 | 30,000 | 80 | 80.481 | 500 | 56 |
| 3 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | 356 | 319 |
| 4 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | 356 | 363 |
| 5 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | 356 | 393 |
| 6 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | 356 | 445 |
| 7 | Exhaust Fan | 53 | 43.5 | 50,000 | 80 | 80.744 | 356 | 501 |
| 8 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | 356 | 554 |
| 9 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | 356 | 603 |
| 10 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | 356 | 633 |
| 11 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | 484 | 319 |
| 12 | Exhaust Fan | 53 | 43.5 | 50,000 | 80 | 80.744 | 484 | 363 |
| 13 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | 484 | 393 |
| 14 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | 484 | 445 |
| 15 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | 484 | 501 |
| 16 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | 484 | 554 |
| 17 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | 484 | 603 |
| 18 | Exhaust Fan | Not operational as part of enhanced exhaust system | | | | | 484 | 633 |
| 19 | Exhaust Fan | 53 | 43.5 | 50,000 | 80 | 80.744 | 600 | 336.5 |
| 20 | Rebond Exhaust Fan | 53 | 24 | 15,000 | 80 | 79.577 | 464 | 534 |
| 21 | Rebond Exhaust Fan | 53 | 24 | 15,000 | 80 | 79.577 | 464 | 546 |

a. Elevation of top of stack above ground level. Stack base elevation = 0 feet.

b. See Figure 2 for stack locations.

## Table 5. GEP Stack Heights and Modeled Stack Heights
## Foamex, L.P. - Orlando Facility

| Source Number | Description | Stack Heights Above Ground Level: GEP (feet) | Modeled (feet) |
|---|---|---|---|
| 1 | Foam Line Stack | 125 | 125 |
| 2 | Long Bun Storage Room Stack | 125 | 125 |
| 3 | Exhaust Fan | Not modeled[a] | |
| 4 | Exhaust Fan | Not modeled[a] | |
| 5 | Exhaust Fan | Not modeled[a] | |
| 6 | Exhaust Fan | Not modeled[a] | |
| 7 | Exhaust Fan | 125 | 53 |
| 8 | Exhaust Fan | Not modeled[a] | |
| 9 | Exhaust Fan | Not modeled[a] | |
| 10 | Exhaust Fan | Not modeled[a] | |
| 11 | Exhaust Fan | Not modeled[a] | |
| 12 | Exhaust Fan | 125 | 53 |
| 13 | Exhaust Fan | Not modeled[a] | |
| 14 | Exhaust Fan | Not modeled[a] | |
| 15 | Exhaust Fan | Not modeled[a] | |
| 16 | Exhaust Fan | Not modeled[a] | |
| 17 | Exhaust Fan | Not modeled[a] | |
| 18 | Exhaust Fan | Not modeled[a] | |
| 19 | Exhaust Fan | 125 | 53 |
| 20 | Rebond Exhaust Fan | 100 | 53 |
| 21 | Rebond Exhaust Fan | 100 | 53 |

a. Exhaust fans 3 - 6, 8 - 11, and 13 - 17 are not operational as part of enhanced exhaust system and therefore were not modeled.

## 11.0 COMPOUNDS AND APPLICABLE STANDARDS

The impacts of the compounds listed in Table 6 below were examined in this dispersion modeling analysis. The resulting concentrations were then compared with the listed applicable FDEP AAAC's to determine if they are below the AAAC's.

**Table 6. Compounds Analyzed and AAAC's**
**Foamex, L.P. - Orlando, Florida**

| Compound | Averaging Time | FDEP AAAC ($\mu g/m^3$) |
|---|---|---|
| Methylene Chloride | 8-hour | 1,740 |
| | 24-hour | 417.6 |
| | Annual | 2.1 |
| Toluene Diisocyanate | 8-hour | 0.36 |
| | 24-hour | 0.0864 |
| 1,1,1-Trichloroethane | 8-hour | 38,200 |
| | 24-hour | 9,168 |

## 12.0 CONCENTRATIONS CALCULATED

For comparison with the FDEP AAAC's the maximum concentrations were calculated for each compound by the ISCST2 model for the 8-hour and 24-hour averaging times. The annual average concentration was also calculated for methylene chloride by the ISCST2 model by using the PERIOD keyword in the averaging times parameter list.

## 13.0 EMISSION RATES

Maximum hourly and daily usage rates were used to calculate the 8-hour and 24-hour average emission rates for each compound listed in Table 6. The maximum annual usage of methylene chloride was used to calculate the annual average emission rates of methylene chloride from the facility. The calculation of the emission rates used in the analysis is shown below and summarized in Table 7.

Compounds modeled:

Methylene Chloride
Toluene Diisocyanate (TDI)
1,1,1-Trichloroethane

Slabstock Foam Production Methylene Chloride emission distribution:

| | | |
|---|---|---|
| Foam Line Stack | = | 60% |
| Long Bun Storage Room Stack | = | 35% |
| 3 Exhaust Fans | = | 5% |

It is assumed that the 3 exhaust fans' emissions are equally distributed among all 3 exhaust fans.

Maximum daily slabstock foam production hours of operation = 6.0 hr/day

Maximum daily slabstock foam production methylene chloride usage = 14,000 lb/day

8-hour average slabstock foam production methylene chloride emission rate = 14,000 lb/day ÷ 8 hr/day
= 1,750.0 lb/hr

Distributed 8-hour average slabstock foam production methylene chloride emission rates:

| | | | | |
|---|---|---|---|---|
| Foam Line Stack | = | 1,750.0 lb/hr x 60% | = | 1,050.0 lb/hr |
| Long Bun Storage Room Stack | = | 1,750.0 lb/hr x 35% | = | 612.5 lb/hr |
| 3 Exhaust Fans | = | 1,750.0 lb/hr x 5% | = | 87.5 lb/hr |

Maximum hourly glue usage rate = 3.1 lb/hr

Maximum methylene chloride content of glue = 70%

Maximum hourly gluing process methylene chloride emission rate = 3.1 lb/hr x 70% = 2.17 lb/hr

Maximum daily foam fabrication hours of operation = 24.0 hr/day

8-hour average gluing process methylene chloride emission rate:

| | | | | |
|---|---|---|---|---|
| 3 Exhaust Fans | = | 2.17 lb/hr x 8 hr/day ÷ 8 hr/day | = | 2.17 lb/hr |

Distributed 8-hour average total methylene chloride emission rates:

| | | | | |
|---|---|---|---|---|
| Foam Line Stack | = | 1,050.0 lb/hr | | |
| Long Bun Storage Room Stack | = | 612.5 lb/hr | | |
| 3 Exhaust Fans | = | 87.5 lb/hr + 2.17 lb/hr | = | 89.67 lb/hr |
| Each Exhaust Fan | = | 89.67 lb/hr ÷ 3 | = | 29.89 lb/hr |

24-hour average slabstock foam production methylene chloride emission rate = 14,000 lb/day ÷ 24 hr/day
= 583.333 lb/hr

Distributed 24-hour average slabstock foam production methylene chloride emission rates:

| | | | | |
|---|---|---|---|---|
| Foam Line Stack | = | 583.333 lb/hr x 60% | = | 350.0 lb/hr |
| Long Bun Storage Room Stack | = | 583.333 lb/hr x 35% | = | 204.167 lb/hr |
| 3 Exhaust Fans | = | 583.333 lb/hr x 5% | = | 29.167 lb/hr |

24-hour average gluing process methylene chloride emission rate:

| | | | | |
|---|---|---|---|---|
| 3 Exhaust Fans | = | 2.17 lb/hr x 24 hr/day ÷ 24 hr/day | = | 2.17 lb/hr |

Distributed 24-hour average total methylene chloride emission rates:

| | | | | |
|---|---|---|---|---|
| Foam Line Stack | = | 350.0 lb/hr | | |
| Long Bun Storage Room Stack | = | 204.167 lb/hr | | |
| 3 Exhaust Fans | = | 29.167 lb/hr + 2.17 lb/hr | = | 31.337 lb/hr |
| Each Exhaust Fan | = | 31.337 lb/hr ÷ 3 | = | 10.4457 lb/hr |

Maximum annual slabstock foam production methylene chloride usage = 551,192 lb/yr

Annual slabstock foam production average methylene chloride emission rate = 551,192 lb/yr ÷ 8,760 hr/yr
= 62.921 lb/hr

Distributed annual slabstock foam production average methylene chloride emission rates:

| | | | | |
|---|---|---|---|---|
| Foam Line Stack | = | 62.921 lb/hr x 60% | = | 37.7526 lb/hr |
| Long Bun Storage Room Stack | = | 62.921 lb/hr x 35% | = | 22.02235 lb/hr |
| 3 Exhaust Fans | = | 62.921 lb/hr x 5% | = | 3.14605 lb/hr |

Maximum annual glue usage = 4,600 lb/yr

Annual gluing process average methylene chloride emission rate = 4,600 lb/yr x 70% ÷ 8,760 hr/yr
= 0.3676 lb/hr

Distributed annual average total methylene chloride emission rates:

| | | | |
|---|---|---|---|
| Foam Line Stack | = 37.7526 lb/hr | | |
| Long Bun Storage Room Stack | = 22.02235 lb/hr | | |
| 3 Exhaust Fans | = 3.14605 lb/hr + 0.3676 lb/hr | = | 3.51365 lb/hr |
| Each Exhaust Fan | = 3.51365 lb/hr ÷ 3 | = | 1.171217 lb/hr |

Maximum slabstock foam production TDI emission rate = 0.37 lb/hr

Maximum daily slabstock foam production hours of operation = 6.0 hr/day

Maximum daily slabstock foam production TDI emissions = 0.37 lb/hr x 6.0 hr/day = 2.22 lb/day

TDI emission factor = 0.000028 lb emitted/lb used

Maximum hourly rebond process TDI usage rate = 164 lb/hr

Maximum hourly rebond process TDI emission rate = 164 lb/hr x 0.000028 lb/lb = 0.0046 lb/hr

Maximum daily rebond process hours of operation = 24.0 hr/day

8-hour average TDI emission rates:

| | | | |
|---|---|---|---|
| Foam Line Stack | = 2.22 lb/day ÷ 8 hr/day | = | 0.2775 lb/hr |
| 2 Rebond Exhaust Fans | = 0.0046 lb/hr x 8 hr/day ÷ 8 hr/day | = | 0.0046 lb/hr |
| Each Rebond Exhaust Fan | = 0.0046 lb/hr ÷ 2 | = | 0.0023 lb/hr |

24-hour average TDI emission rates:

| | | | |
|---|---|---|---|
| Foam Line Stack | = 2.22 lb/day ÷ 24 hr/day | = | 0.0925 lb/hr |
| 2 Rebond Exhaust Fans | = 0.0046 lb/hr x 24 hr/day ÷ 24 hr/day | = | 0.0046 lb/hr |
| Each Rebond Exhaust Fan | = 0.0023 lb/hr ÷ 2 | = | 0.0023 lb/hr |

Maximum hourly glue usage rate = 3.1 lb/hr

Maximum 1,1,1-trichloroethane content of glue = 81%

Maximum hourly 1,1,1-trichloroethane emission rate = 3.1 lb/hr x 81% = 2.5 lb/hr

Maximum daily foam fabrication hours of operation = 24.0 hr/day

8-hour average 1,1,1-trichloroethane emission rates:

| | | | |
|---|---|---|---|
| 3 Exhaust Fans | = 2.5 lb/hr x 8 hr/day ÷ 8 hr/day | = | 2.5 lb/hr |
| Each Exhaust Fan | = 2.5 lb/hr ÷ 3 | = | 0.83333 lb/hr |

24-hour average 1,1,1-trichloroethane emission rates:

| | | | |
|---|---|---|---|
| 3 Exhaust Fans | = | 2.5 lb/hr x 24 hr/day ÷ 24 hr/day | = 2.5 lb/hr |
| Each Exhaust Fan | = | 2.5 lb/hr ÷ 3 | = 0.83333 lb/hr |

**Table 7. Emission Rates**
**Foamex, L.P. - Orlando, Florida**

| | | Emission Rates for Compounds Modeled | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Methylene Chloride | | | Toluene Diisocyanate | | 1,1,1-Trichloroethane | |
| Source Number | Source Description | 8-hour (lb/hr) | 24-hour (lb/hr) | Annual (lb/hr) | 8-hour (lb/hr) | 24-hour (lb/hr) | 8-hour (lb/hr) | 24-hour (lb/hr) |
| 1 | Foam Line Stack | 1,050.0 | 350.0 | 37.7526 | 0.2775 | 0.0925 | 0.0 | 0.0 |
| 2 | Long Bun Storage Room Stack | 612.5 | 204.167 | 22.02235 | 0.0 | 0.0 | 0.0 | 0.0 |
| 3 | Exhaust Fan[a] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 4 | Exhaust Fan[a] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5 | Exhaust Fan[a] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 6 | Exhaust Fan[a] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 7 | Exhaust Fan | 29.89 | 10.4457 | 1.171217 | 0.0 | 0.0 | 0.83333 | 0.83333 |
| 8 | Exhaust Fan[a] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 9 | Exhaust Fan[a] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 10 | Exhaust Fan[a] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 11 | Exhaust Fan[a] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 12 | Exhaust Fan | 29.89 | 10.4457 | 1.171217 | 0.0 | 0.0 | 0.83333 | 0.83333 |
| 13 | Exhaust Fan[a] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 14 | Exhaust Fan[a] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 15 | Exhaust Fan[a] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 16 | Exhaust Fan[a] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 17 | Exhaust Fan[a] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 18 | Exhaust Fan[a] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 19 | Exhaust Fan | 29.89 | 10.4457 | 1.171217 | 0.0 | 0.0 | 0.83333 | 0.83333 |
| 20 | Rebond Exhaust Fan | 0.0 | 0.0 | 0.0 | 0.0023 | 0.0023 | 0.0 | 0.0 |
| 21 | Rebond Exhaust Fan | 0.0 | 0.0 | 0.0 | 0.0023 | 0.0023 | 0.0 | 0.0 |

a. Exhaust fans 3 - 6, 8 - 11, and 13 - 17 are not operational as part of enhanced exhaust system and therefore were not modeled.

## 14.0 RESULTS

The ISCST2 modeling was conducted for each compound and each averaging using the emission rates presented in Section 13.0. The overall maximum ground level concentrations from the ISCST2 modeling for each case are presented in Table 8 below. The output listings for each case are presented in Appendixes D through J. For comparison, Table 8 also shows the applicable FDEP AAAC's for each compound and averaging time. For the 8-hour and 24-hour averaging times for each compound the maximum ground level concentrations are less than 90% of the applicable FDEP AAAC's. The resulting maximum annual ground level concentration for methylene chloride is 2.09998 $\mu g/m^3$, which is below the FDEP annual AAAC for methylene chloride of 2.1 $\mu g/m^3$. Therefore, based on the results of this dispersion modeling analysis, the emissions from the Foamex facility comply with FDEP's AAAC's.

**Table 8. ISCST2 Modeling Results and Comparison with FDEP AAAC's**
**Foamex, L.P. - Orlando, Florida**

| Compound | Averaging Time | Maximum ISCST2 Ground Level Concentration ($\mu g/m^3$) | FDEP AAAC ($\mu g/m^3$) |
|---|---|---|---|
| Methylene Chloride | 8-hour | 1,538.9 | 1,740 |
| | 24-hour | 250.8 | 417.6 |
| | Annual | 2.09998 | 2.1 |
| Toluene Diisocyanate | 8-hour | 0.29 | 0.36 |
| | 24-hour | 0.04 | 0.0864 |
| 1,1,1-Trichloroethane | 8-hour | 10.1 | 38,200 |
| | 24-hour | 6.7 | 9,168 |

**Harding Lawson Associates**

March 15, 1996

VIA FACSIMILE
(904) 922-6979

26005.F21.816

Mr. C.H. Fancy, P.E.
Division of Air Resources Management
Florida Department of Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

**Request for Permit Amendment**
**Foamex, L.P.**
**Permit No. AC48-214902**

Dear Mr. Fancy:

This letter is to provide clarification regarding the requested modification of Construction Permit AC48-214902 for the Foamex L.P. flexible polyurethane foam manufacturing facility located in Orlando, Florida.

In our letter dated March 1, 1996, we explained that the permit amendment is requested to obtain approval to increase the annual methylene chloride usage at the Orlando facility. As we discussed during our meeting on February 22, 1996, this increase is requested to allow the facility to prepare for installation and startup of a new process technology, that will greatly reduce the use of methylene chloride as a blowing agent at the facility, and may eventually eliminate the need for it entirely. The requested increase is intended only for a maximum of five years. After this time period is expired (and perhaps before), the facility's methylene chloride usage will be greatly reduced.

Should you have any questions or comments concerning this matter, please do not hesitate to contact Kay Rykowski or Joe Tessitore at (407) 851-1484.

Yours very truly,

HARDING LAWSON ASSOCIATES

Patricia Kay Rykowski
Patricia Kay Rykowski
Senior Engineer

Joseph L. Tessitore
Joseph L. Tessitore, P.E.
Managing Principal

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cc: Mr. Doug Terrill, Foamex International
Mr. Tom Burghardt, Foamex International

Engineering and
Environmental Services

4763 South Conway Road, Orlando, FL 32812 407/851-1484 Fax 407/855-0369
*A Subsidiary of Harding Associates • Offices Nationwide*

APR-15-96 13:27 FROM:HARDING LAWSON ASSOC ID:4078550389 PAGE 2/2

**Harding Lawson Associates**

March 15, 1996

VIA FACSIMILE
(904) 922-6979

26005.F21.816

Mr. C.H. Fancy, P.E.
Division of Air Resources Management
Florida Department of Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

**Request for Permit Amendment**
**Foamex, L.P.**
**Permit No. AC48-214902**

Dear Mr. Fancy:

This letter is to provide clarification regarding the requested modification of Construction Permit AC48-214902 for the Foamex L.P. flexible polyurethane foam manufacturing facility located in Orlando, Florida.

In our letter dated March 1, 1996, we explained that the permit amendment is requested to obtain approval to increase the annual methylene chloride usage at the Orlando facility. As we discussed during our meeting on February 22, 1996, this increase is requested to allow the facility to prepare for installation and startup of a new process technology, that will greatly reduce the use of methylene chloride as a blowing agent at the facility, and may eventually eliminate the need for it entirely. The requested increase is intended only for a maximum of five years. After this time period is expired (and perhaps before), the facility's methylene chloride usage will be greatly reduced.

Should you have any questions or comments concerning this matter, please do not hesitate to contact Kay Rykowski or Joe Tessitore at (407) 851-1484.

Yours very truly,

HARDING LAWSON ASSOCIATES

Patricia Kay Rykowski
Patricia Kay Rykowski
Senior Engineer

Joseph L. Tessitore
Joseph L. Tessitore, P.E.
Managing Principal

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cc: Mr. Doug Terrill, Foamex International
Mr. Tom Burghardt, Foamex International



APR-15-96 13:27 FROM:HARDING LAWSON ASSOC ID:4078550389 PAGE 2/2

Memorandum

Florida Department of
**Environmental Protection**

To: Howard L. Rhodes

Thru: C. H. Fancy

From: Willard Hanks

Date: June 19, 1996

Subject: Modification of Permit
Foamex, L.P.

Attached for your approval and signature is a letter that will modify the construction permit for Foamex's flexible polyurethane foam manufacturing facility located in Orlando, Orange County, Florida.

The modification will allow the permittee to increase methylene chloride usage and emissions by approximately 12 percent from 261 to 280 TPY. This will result in a 19 TPY increase in methylene chloride emissions. The foam fabrication operation will be conducted in a smaller area which will allow 14 of the 17 exhaust fans to be shut down. The permit will be extended for 1 year to allow time to obtain a permit to operate.

Modeling results of the reconfigured plant and higher emission rates shows the Ambient Reference Concentration for methylene chloride is not exceeded.

The only comments received in response to the public notice were from the applicant. Foamex requested the allowable methylene chloride emissions from the facility and the slabstock polyurethane foam process be clarified. The Bureau agreed to this request and reworded the changes to proposed Specific Condition No. 2.

I recommend your approval and signature.

CHF/wh/t

Attachments

P 339 251 114

US Postal Service
**Receipt for Certified Mail**
No Insurance Coverage Provided.
Do not use for International Mail *(See reverse)*

| | |
|---|---|
| Sent to | Douglas Jerrid |
| Street & Number | Gaarnex, LP |
| Post Office, State, & ZIP Code | Orlando, FL |
| Postage | $ |
| Certified Fee | |
| Special Delivery Fee | |
| Restricted Delivery Fee | |
| Return Receipt Showing to Whom & Date Delivered | |
| Return Receipt Showing to Whom, Date, & Addressee's Address | |
| TOTAL Postage & Fees | $ |
| Postmark or Date | AC 48-214902A 6-21-96 |

PS Form **3800**, April 1995

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- Complete items 3, and 4a & b.
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- Write "Return Receipt Requested" on the mailpiece below the article number.
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Consult postmaster for fee.

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Douglas L. Jerrid, P.M.
Gaarnex, LP
1351 Gemini Blvd
Orlando, FL 32837

4a. Article Number
P 339 251 114

4b. Service Type
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

5. Signature (Addressee)

6. Signature (Agent)
X

7. Date of Delivery
6-24

8. Addressee's Address (Only if requested and fee is paid)

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