FACILITY PERMIT REVIEW SHEET

DATE: 12/29/2011 **APPLICATION NUMBER:** 0310334-008-AC

FACILITY NAME: Johns Manville

FACILITY DESCRIPTION: Foam insulation manufacturing

PERMIT PROCESSOR: C. Blane Johnson

MAJOR FOR CRITERIA POLLUTANTS AND/OR HAPs (Circle)

CO PB NO_x PM SO_2 VOC HAP

SUBJECT TO: (Circle)

NSR(PSD) PERMIT NUMBER: _____

NSR(NAA) PERMIT NUMBER: _____

BACT EU NUMBER: _____

MACT EU NUMBER: _____

RACT EU NUMBER: _____

NSPS EU NUMBER: _____

FACILITY EMISSION SUMMARY

	POTENTIAL EMISSIONS	ALLOWABLE EMISSIONS	
	TPY	LBS/HR	TPY
PM	15.03	9.06	39.7
PM10			
SO2			
NOX			
CO			
VOC	77.0		100
TOC			
PB			
TOTAL HAP	0.175		25
SINGLE HAP (highest)	0.167		10

COMMENTS: The highest HAP is Methylene Diphenyl Diisocyanate (MDI).

Effective 2/27/97

EMISSIONS CALCULATIONS

APPLICATION NUMBER: 0310334-008-AC **EU NUMBER:** 001

REFERENCES: 0310334-008-AC application, annual test data, and quarterly reports

POLLUTANT: Volatile Organic Compounds (VOC's)

ALLOWABLE EMISSIONS

LBS/HR	TPY	% OPACITY	CONCENTRATION	OTHER
	100			

POTENTIAL EMISSION CALCULATIONS

process rate (MMbrd.ft./yr) X VOC emission factor (lb/MMbrd.ft.) = PTE

370.0 226.9 = 83953 lb/yr
= 42.0 tons/yr

RULE APPLICABILITY: **FEDERAL** **STATE** **LOCAL**

COMMENTS: Includes +20% safety factor.

POLLUTANT: Particulate Matter (PM)

ALLOWABLE EMISSIONS

air flowrate (ft^3/min) X allowable concentration (gr/ft^3) / (gr/lb) X (min/hr) = Allowable Emissions

20,000 0.03 7000 60 = 5.14 lb/hr
= 22.5 tons/yr

LBS/HR	TPY	% OPACITY	CONCENTRATION	OTHER
	22.5	5	0.03 gr/ft^3	

POTENTIAL EMISSION CALCULATIONS

air flowrate (ft^3/min) X actual concentration (gr/ft^3) / (gr/lb) X (min/hr) = Allowable Emissions

20,000 0.02 7000 60 = 3.43 lb/hr
= 15.0 tons/yr

RULE APPLICABILITY: **FEDERAL** **STATE** **LOCAL**

COMMENTS:

PERMIT PROCESSOR: **DATE:**

Effective 2/27/97

EMISSIONS CALCULATIONS

APPLICATION NUMBER: 0310334-008-AC **EU NUMBER:** 002

REFERENCES: 0310334-008-AC application, annual test data, and quarterly reports. Two (2) 0.478 MMBtu/hr (combined 0.956 MMBtu/hr) natural gas fired burners. There are three (3) emission points for this EU; the pour table vent, the laminator chamber vent, and the burner vent.

POLLUTANT: Nitrogen Oxides (NO_X)

ALLOWABLE EMISSIONS

LBS/HR	TPY	% OPACITY	CONCENTRATION	OTHER

POTENTIAL EMISSION CALCULATIONS

heat input (MMBtu/hr) X emission factor (lb/MMBtu) X operation time (hr/yr) = Potential to Emit (PTE)

0.956	9.80E-02	8760	=	821	lb/yr
			=	0.4	tons/yr

RULE APPLICABILITY: **FEDERAL** **STATE** **LOCAL**

COMMENTS: Emission factor from AP-42 Table 1.4-1.

POLLUTANT: Carbon Monoxide (CO)

ALLOWABLE EMISSIONS

LBS/HR	TPY	% OPACITY	CONCENTRATION	OTHER

POTENTIAL EMISSION CALCULATIONS

heat input (MMBtu/hr) X emission factor (lb/MMBtu) X operation time (hr/yr) = Potential to Emit (PTE)

0.956	8.24E-02	8760	=	690	lb/yr
			=	0.3	tons/yr

RULE APPLICABILITY: **FEDERAL** **STATE** **LOCAL**

COMMENTS: Emission factor from AP-42 Table 1.4-1.

POLLUTANT: Sulfur Oxides (SO_x)

ALLOWABLE EMISSIONS

LBS/HR	TPY	% OPACITY	CONCENTRATION	OTHER

POTENTIAL EMISSION CALCULATIONS

heat input (MMBtu/hr) X emission factor (lb/MMBtu) X operation time (hr/yr) = Potential to Emit (PTE)

0.956	5.88E-04	8760	=	5	lb/yr
			=	0.002	tons/yr

RULE APPLICABILITY:

FEDERAL	STATE	LOCAL

COMMENTS: Emission factor from AP-42 Table 1.4-2.

POLLUTANT: Particulate Matter (PM)

ALLOWABLE EMISSIONS

LBS/HR	TPY	% OPACITY	CONCENTRATION	OTHER
3.92	17.2	5	0.03 g/ft^3	

vent flowrate (ft^3/min) X maximum allowable emission concentration (g/ft^3) X min/hr / g/lb = Allowable Emissions

15,250	0.03	60	7000	=	3.92	lb/hr
				=	17.2	tons/yr

POTENTIAL EMISSION CALCULATIONS

heat input (MMBtu/hr) X emission factor (lb/MMBtu) X operation time (hr/yr) = Potential to Emit (PTE)

0.956	7.45E-03	8760	=	62	lb/yr
			=	0.03	tons/yr

RULE APPLICABILITY:

FEDERAL	STATE	LOCAL
	62-296.712(2)	2.1101

COMMENTS: Emission factor from AP-42 Table 1.4-2.

POLLUTANT: Volatile Organic Compounds (VOC's)

ALLOWABLE EMISSIONS

LBS/HR	TPY	% OPACITY	CONCENTRATION	OTHER
	100			

POTENTIAL EMISSION CALCULATIONS

Burners

heat input (MMBtu/hr) X emission factor (lb/MMBtu) X operation time (hr/yr) = Potential to Emit (PTE)

0.956	5.39E-03	8760	=	45	lb/yr
			=	0.02	tons/yr

Pour Table

process rate (MMbrd.ft./yr) X VOC emission factor (lb/MMbrd.ft.) = PTE

832.2	39.5	=	32872	lb/yr
		=	16.4	tons/yr

Laminator Chamber

process rate (MMbrd.ft./yr) X VOC emission factor (lb/MMbrd.ft.) = PTE

832.2	32.3	=	26880	lb/yr
		=	13.4	tons/yr

Emission Unit Total = 29.9 tons/yr

RULE APPLICABILITY:	FEDERAL	STATE	LOCAL

COMMENTS: Includes +20% safety factor.

POLLUTANT: Hazardous Air Pollutants (HAP's)

ALLOWABLE EMISSIONS

LBS/HR	TPY	% OPACITY	CONCENTRATION	OTHER
	10			

POTENTIAL EMISSION CALCULATIONS

Laminator

brd.ft. / board thickness (in.) X # of sides X (m^2/ft^2) = surface area (m^2)

8.32E+08	2.2048	2	0.0929	=	7.01E+07

constant X vap.press. (atm) X mol.wgt. (g) X surf.area (m^2) X air speed ($0.56^{0.78}$m/sec) X tack free time (sec) / temp. (˚K) / (g/lb) / (lb/ton) = process release (tons/yr)

25.4	5.26E-06	250	7.01E+07	0.63618974	30		
295	454	2000			=	0.167	tons/yr

Burner

heat input (MMBtu/hr) X emission factor (lb/MMBtu) X operation time (hr/yr) = Potential to Emit (PTE)

0.956	1.85E-03	8760	=	15.5	lb/yr
			=	0.01	tons/yr

Emission Unit Total = 0.175 tons/yr

RULE APPLICABILITY: **FEDERAL** **STATE** **LOCAL**

COMMENTS: The sole source of HAP from the laminator is the Methylene Diphenyl Diisocyanate (MDI) used for the polyeurathane manufacturing process. For the burner, the emission factors are from AP-42 Table 1.4-3 and 1.4-4, the highest HAP is Hexane at 1.8X10-3 lb/MMBtu (14.8 lb/yr).

PERMIT PROCESSOR: _____ **DATE:** _____

Effective 2/27/97

EMISSIONS CALCULATIONS

APPLICATION NUMBER: 0310334-008-AC **EU NUMBER:** Storage

REFERENCES: 0310334-008-AC application and 0310334-004-AC application

POLLUTANT: Volatile Organic Compounds (VOC's)

ALLOWABLE EMISSIONS

LBS/HR	TPY	% OPACITY	CONCENTRATION	OTHER
	100			

POTENTIAL EMISSION CALCULATIONS

production rate (brd.ft./yr) X VOC emission factor (lb/brd.ft) / (lb/ton) = PTE

8.32E+08	7.71E-06	2000	=	3.2	tons/yr

RULE APPLICABILITY: **FEDERAL** **STATE** **LOCAL**

COMMENTS:

POLLUTANT:

ALLOWABLE EMISSIONS

LBS/HR	TPY	% OPACITY	CONCENTRATION	OTHER

POTENTIAL EMISSION CALCULATIONS

RULE APPLICABILITY: **FEDERAL** **STATE** **LOCAL**

COMMENTS:

PERMIT PROCESSOR: **DATE:**

Effective 2/27/97

EMISSIONS CALCULATIONS

APPLICATION NUMBER: 0310334-008-AC **EU NUMBER:** Tanks

REFERENCES: 0310334-008-AC application, annual test data, quarterly reports, and EPA publication 453/R-95-017.

POLLUTANT: Volatile Organic Compounds (VOC's)

ALLOWABLE EMISSIONS

LBS/HR	TPY	% OPACITY	CONCENTRATION	OTHER
	100			

POTENTIAL EMISSION CALCULATIONS

Component	# of components	X component emission factor (lb/hr)	X (hr/yr)	/ (lb/ton)	=	PTE
Valves	8	0.0089	8760	2000	=	0.31
Pumps	2	0.0438	8760	2000	=	0.38
Reliefs	1	0.2290	8760	2000	=	1.00
Connectors	10	0.0040	8760	2000	=	0.18
Total					=	1.9 tons/yr

RULE APPLICABILITY: **FEDERAL** **STATE** **LOCAL**

COMMENTS: The VOC emissions from all facility tanks [two (2) 12,000 gallon MDI tanks, three (3) 8,000 gallon Polyol tanks, and numerous sealed 300 gallon totes of Surfactant, Flame Retardant, and other additives are insignificant. This also includes the one (1) 30,000 gallon Pentane tank as it is sealed, kept under positive pressure and vented to the truck when filling, there are however, equipment leak emissions associated with the pentane piping system as calculated above.

POLLUTANT: Hazardous Air Pollutants (HAP's)

ALLOWABLE EMISSIONS

LBS/HR	TPY	% OPACITY	CONCENTRATION	OTHER
	10			

POTENTIAL EMISSION CALCULATIONS

RULE APPLICABILITY: **FEDERAL** **STATE** **LOCAL**

COMMENTS: The sole sorce of HAP's is the Methylene Diphenyl Diisocyanate (MDI) used for the polyeurathane manufacturing process. MDI emissions from the two (2) 12,000 gallon storage tanks is insignificant per the TANKS 4.09d program.

PERMIT PROCESSOR: _____ **DATE:** _____

Effective 2/27/97