TOXIC SUBSTANCE REDUCTION PLAN FOR METHYLENEBIS (PHENILISOCYANATE) (CAS # 101-68-8) AND POLYMERIC DIPHENYLMETHANE DIISOCYANATE (CAS # 9016-87-9)

TALMOLDER INC.

As required by O. Reg. 455/09

Dec 6,2013

This Toxic Reduction Plan Summary accurately reflects the Toxic Substance Reduction Plan Dated December 6, 2013 that was prepared by Talmolder Inc. As required by Ontario Regulation 455/09.

1 STATEMENT OF INTENT AND OBJECTIVE OF THE PLAN

Talmolder Inc. (Talmolder) is a leader in the manufacturing and engineering of specialty molded foam products. During is operation; Talmolder uses Methylenebis (phenylisocyanate) (MDI) and Polymeric diphenylmethane diisocyanate (P-MDI) as raw material in the production of molded polyurethane products. Talmolder intends to reduce the use of this toxic substance at the facility. This facility does not create MDI and P-MDI; therefore this plan will not address reducing its creation.

Talmolder will strive to eliminate the use of toxic substances at the facility; this plan will establish the technical and economic feasibility of each option in order to determine which are viable for implementation at this time.

Talmolder's target is to reduce the use of Methylenebis (phenylisocyanate) (MDI) and Polymeric diphenylmethane diisocyanate (P-MDI) by 0.15% in 8 to 12 months by replacing one Low Pressure Dispensing Machine with a High Pressure Dispensing Machine.

2 DESCRIPTION OF TOXIC SUBSTANCE FOUND AT TALMOLDER

There are six substances that are contained in Phase II that require the development of a toxic substance reduction plan based on the criteria set out in the Toxic Reductions Act, 209 and Ontario Regulation 455/09.

These substances are:

Pentane (CAS# 109-66-0)

- Used as blowing agent in the production of polyurethane foams
- The quantification method is mass balance
- Has unique direct and indirect costs

Acetone (CAS# 67-64-1)

- Used as cleaner agent and to flush supply lines
- The quantification method is mass balance
- Has unique direct and indirect costs

Solvent naphtha light aliphatic (CAS# 64742-89-8)

- Used as mold release applied manually
- The quantification method is mass balance
- Has unique direct and indirect costs

Stoddard solvent (CAS# 8052-41-3)

- Used as mold release applied manually
- The quantification method is mass balance

- Has unique direct and indirect costs

Methylenebis (phenylisocyanate) (CAS# 101-68-8)
- Used as reactant in the production of polyurethane foam
- The quantification method is mass balance
- Has unique direct and indirect costs

Polymeric diphenylmethane diisocyanate (CAS# 9016-87-9)
- Used as reactant in the production of polyurethane foam
- The quantification method is mass balance
- Has unique direct and indirect costs

3 FACILITY INFORMATION

Facility name	Talmolder Inc.	
Address	325 Limestone Crescent Downsview, Ontario, M3J 2R1 Canada	
NPRI Identification number	5933	
Two Digit NAICS Code	32	Manufacturing
Four Digit NAICS Code	3261	Plastic Product Manufacturing
Six Digit NAICS Code	326150	Urethane and Other Foam Product (except Polystyrene) Manufacturing
Number of Full-time Employees	79	
UTM Spatial Coordinates	UTM Zone	17T
	Easting	621950
	Northing	4848789
	Latitude	43.7823
	Longitude	-79.4851
	Datum	1983

3.1 Owner of the facility information

Name:	The Milestone Group
Address:	1600 Steeles Avenue, Suite 200 Concord, Ontario, L4K 4M2
Phone Number	905-738-1838
Fax Number	905-738-3846
E-mail	john.dilorenzo@milestonegroup.ca

3.2 Operator of the Facility Information

Facility name	Talmolder Inc.
Address	325 Limestone Crescent Downsview, Ontario, M3J 2R1 Canada
Phone Number	416-736-1991

Fax Number	416-736-7942
E-mail	harry@talmolder.com

3.3 Highest Ranking Employee at the Facility Information

Name:	Harindran Nionathan
Position	Manager of Operations
Address	325 Limestone Crescent Downsview, Ontario, M3J 2R1 Canada
Phone Number	416-736-1991
Fax Number	416-736-7942
E-mail	harry@talmolder.com

3.4 Parent Company Information

Legal Name:	Global Upholstery Co Inc
Address	560 Supertest Road Downsview, Ontario, M3J 2M6
Percentage of Facility owned	100%
CRA Business Number	100157486

3.5 Toxic Substances for Which Facility Must Prepare Plan

Substance 1 (other plan)	Pentane
CAS Number	109-66-0
Substance 2 (other plan)	Acetone
CAS Number	67-64-1
Substance 3 (other plan)	Solvent naphtha light aliphatic
CAS Number	64742-89-8
Substance 4 (other plan)	Stoddard solvent
CAS Number	8052-41-3
Substance 5 (this plan)	Methylenebis (phenylisocyanate) (MDI)
CAS Number	101-68-8
Substance 6 (this plan)	Polymeric diphenylmethane diisocyanate (P-MDI)
CAS Number	9016-87-9

3.6 Plan Contacts

Plan prepared and certified by:	German Rincon
Planner License	TSRP0197
Address	134 Gilley Rd North York, Ontario, M3K 1L9 Canada
Phone Number	416-716-0042
Fax Number	416-352-5768
E-mail	german@ec2consulting.ca
Plan Coordinator	Vadim Bytensky

Address	325 Limestone Crescent Downsview, Ontario, M3J 2R1 Canada
Phone Number	416-736-1991
Fax Number	416-736-7942
E-mail	vadim_bytensky@talmolder.com

4 IDENTIFICATION AND ANALYSIS OF TOXIC SUBSTANCE REDUCTION OPTIONS FOR MDI AND P-MDI

This plan will generate possible options for toxic reduction in seven categories: Material or Feedstock Substitution Options, Product Design or Reformulation, Equipment or Process Modification, Spill and Leak Prevention, Onsite Reuse or Recycling, Improved Inventory Management or Purchasing Techniques, Training or Improved Operating Practices.

4.1 Material or Feedstock Substitution Options

4.1.1 Using other raw material

MDI and P-MDI are being used at Talmolder because they are the raw materials for the production of molded foams; therefore it is the main raw material used at the plant. Talmolder worked quite a few years to substitute all Toluene Diisocyanate (TDI) for MDI and P-MDI due to much higher toxicity of TDI in order to improve the plant environment for the operators. Therefore, no other alternatives were identified in the category of Material Feedstock Substitution.

4.2 Product Design or Reformulation

4.2.1 Offer Products That Use Water as a Blowing Agent

Foams sold at Talmolder offer very specific characteristics to its clients in terms of softness, flexibility, resistance, strength, durability and many others. By reformulating the product, Talmolder would not be able to continue offering these characteristics.

On the other hand, Talmolder manufactures each product by using proprietary mixes. Such blends are the result of many years of experience and experimentation, invested in creating products with specific strength and durability. Therefore they are the optimal combination of all the components and any change would diminish the quality of the product offered. For this reason, no option was identified in the category of Product Design or Reformulation

4.3 Equipment or Process Modification

4.3.1 Changing Low-Pressure Dispensing Machines to High-Pressure

At the time the company uses a mix of High-pressure and low-pressure dispensing machines. According to the EPA[1]: "*In a high pressure system, iMDIngement of the high pressure streams within the mix head mixes the raw materials. The low pressure system relies on a rotating mixer within the mix head to blend the raw materials".* High-pressure dispensing machines inject a determined amount of mix in the mold at high pressure according to the specific mold; therefore very little waste is produced since the amounts are almost exact. Low-pressure dispensing machines dispense a fixed amount of mix

[1] Manual Best Practices for Pollution Prevention in the Slabstock and Molded Flexible Polyurethane Foam Industry, US EPA, September 1996

according to each product, however, the operator starts by emptying a small amount of the mix in a bin or disposal container before pouring the mix in the mold. After the operator finishes pouring the right amount in the mold, he or she moves the mixing head over to the bin in order to dispose of the final product contained in the mixer as well as the solvent used by the head in order to flush the mix. Therefore there is waste because this process uses more mixture than required. It is estimated that about $0.5 - $0.6 is wasted in this process per shot including the solvent, Pentane and Isocyanate. Right now 5 low-pressure machines are still in use. Therefore, by changing LP machines to HP machines, some of the waste would be saved and therefore the use of MDI and P-MDI should decrease.

4.3.1.1 Estimated reductions

Talmolder currently uses 5 low-pressure (LP) machines and 15 high-pressure (HP) machines to produce about 800,000 units per year i.e. 800,000 shots. Out of these total shots only about 40,000 are done using LP machines or about 5% of the total production. It is estimated that LP require 15% more mix than HP machines. Therefore the initial amount used is as follows:

$$U_i = N_H \times X_H + N_L \times N_L$$

Where

U_i=Initial amount of MDI and P-MDI used by the facility
N_H=Number of shots performed by HP machines
X_H=Amount of MDI and P-MDI per shot used by HP machine
N_L=Number of shots performed by LP machines
X_L=Amount of MDI and P-MDI per shot used by LP machines

$$X_L = X_H \times 1.15$$

Since U_i is equal to the amount used by the facility of MDI and P-MDI, then

U_i= 134,716 kg + 78,122 kg = 218838 kg

From these equations we determine that

X_H=0.275 kg.

Therefore

X_L= 0.316 kg

Multiplying X_L by the amount of shots of LP machines we have that about 12,640 kg are used on LP machines or about 2,528 kg per each machine assuming that all LP machines use about the same amount of MDI and P-MDI and that each machine performs 8,000 shots per year. If we were o perform the same amount of shots in a HP machine, we would spend 2,200 kg.

Thus a LP machine uses 328 kg more per year of MDI and P-MDI. Composed of 207 kg of MDI and 121 kg of P-MDI.

Therefore the reduction would be 207 kg of MDI and 121 kg of P-MDI per dispenser changed from LP to HP

Reduction of MDI use: 207kg/134,716 kg = 0.15%

Reduction of P-MDI use: 121kg/78,122 kg = 0.15%

4.4 Spill and Leak Prevention

4.4.1 Change 2 remaining regular pumps for magnetic coupling pumps

Talmolder has been in the process of replacing regular pumps with magnetic coupling ones, which will reduce the leak potential to almost cero. The packing in the current pumps with mechanical couplings is eroded rapidly by the abrasive action of the components in the fluids that are pumped. In particular it has been determined that pigments are extremely hard on the said seals. Therefore it is necessary to replace such packing every two months in order to avoid leaks through the shafts. This process takes two technicians four hours, plus about $200 worth of materials.

Additionally, even tough the pipes have presented no spills; there is always the possibility of leaks on the lines. Therefore Talmolder will implement immediately a procedure as per lines will be inspected every two weeks in order to keep all the hoses, pipes, accessories and other components in good condition.

4.4.1.1 Estimated reductions

Due to the constant maintenance performed in the actual pumps, it is considered that less than 0.1% of fluid is loss through the shafts. Currently all but 2 pumps have been replaced, assuming that each of the 20 pumps move about the same amount of fluid, these two pumps manage about 10% of the total MDI and P-MDI currently used in the plant. Therefore if the change were to be made, the only savings in MDI and P-MDI would be less than 22 kg per year, however it is something to be taken into account, because compliance rules regarding Isocyanate are very restrictive, therefore this is an option that will be completed within a couple of years as funding becomes available.

In order to calculate the amount of MDI and P-MDI saved via this option we will assume that 0.1% of all fluid that is moved by the pumps is lost trough the shafts. Also that 90% of the MDI and P-MDI is moved by magnetic coupling pumps already installed, thus mechanical coupling pumps only move 10% of the fluid. Therefore:

Reduction of MDI and P-MDI use: 212838 kg * 0.1 * 0.001 = 22 kg

4.5 Onsite Reuse or Recycling

Sine Isocyanate is destroyed once it reacts with Polyol, therefore no option has been identified in this category. However Talmolder is committed to the most efficient use of its raw materials.

4.6 Improved Inventory Management or Purchasing Techniques

No options were identified. Since the company already purchases only the required materials which are used immediately. Also the company is in continuous communication with its providers in order to supply its needs.

4.7 Training or Improved Operating Practices

4.7.1 Training employees on improved dispensing practices

Since it is not possible to change some of the LP dispensers, it is necessary to train the employees into reducing the waste as much as possible.

4.7.1.1 Estimated reductions

Since this is a manual process, it is hard to estimate how much will be saved from training; we will assume that after the training there will be a 10% reduction in waste from the LP dispensing process:

Reduction of MDI use: 207 kg * 10% = 20 kg of MDI

Reduction of P-MDI use: 121 kg * 10%= 12 kg of P-MDI

5 IMPLEMENTATION OF OPTIONS FOR REDUCTION OF THE USE OF MDI AND P-MDI AT THE FACILITY

In order to reduce the use of MDI and P-MDI at the facility, Talmolder has implemented the option described in 6.3.1 as an Equipment or Process Modification. Table 1 presents a summary of the implementation of the option mentioned.

Table 1 Description and Timetable for Implementation of Option 6.3.1

Step	Description	Estimated Timeline
1	Quotations with different suppliers	2 Month
2	Test and presentation by supplier	2 Month
3	Installation of pumps and guns	2-4 Months
4	Calibration of equipment and training	2-4 Months

We can also see in Table 2 a detail of the estimated reduction per such implementation

Table 2 Estimate of Reduction of MDI and P-MDI as by Implementation of Option 6.3.1

Type	Estimated Reduction in kg	Anticipated Date
Use	328	8-12 months
Creation	0	8-12 months
Release to Air	328	8-12 months
Release to Water	0	8-12 months
Release to Land	0	8-12 months
Disposal off-site	0	8-12 months
Disposal on-site	0	8-12 months
Transfer off-site for recycling	0	8-12 months
Contained in Product	0	8-12 months

6 PLANNER RECOMMENDATIONS AND RATIONALE

It is clear that Talmolder is committed to the reduction of use of Toxics, however the quality and durability requirements of its products do not allow exploring any other alternative than the ones described in this Toxic Substance Reduction Plan. For that reason I have no recommendations at the moment.

7 PLAN CERTIFICATIONS FOR MDI AND P-MDI

7.1 CERTIFICATION BY THE HIGHEST RAKING EMPLOYEE

As of December 6, 2013. I Harindran Nianathan, certify that I have read the toxic substance reduction plan for the toxic substance referred to below and am familiar with its contents, and to my knowledge the plan is factual and accurate and complies with the *Toxics Reduction Act, 2009* and Ontario Regulation 455/09 (General) made under that Act

Methylenebis (phenylisocyanate) and Polymeric diphenylmethane diisocyanate

Harindran Nianathan
Manager of Operations
Talmolder Inc.

7.2 CERTIFICATION BY LICENSED PLANNER

As of December 6, 2013. I German Rincon, certify that I am familiar with the processes at Talmolder Inc. That use the toxic substance referred to below, that I agree with the reductions referred to in subparagraphs 7 iii, iv and v of subsection 4 (1) of the *Toxics Reductions Act, 2009* that are set out in the plan dated December 27, 2012 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Methylenebis (phenylisocyanate) and Polymeric diphenylmethane diisocyanate

German Rincon [Planner License # TSRP0197]
General Manager
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