TOXIC SUBSTANCE REDUCTION PLAN FOR SUMMARY FOR PENTANE (CAS # 109-66-0)

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 Pentane as a blowing agent as part of a patented process that that replaced the use of CFC's. Talmolder intends to reduce the use of this toxic substance at the facility. This facility does not create Pentane; 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 determine the technical and economic feasibility of each option to determine which are viable for implementation at this time

Talmolder's production is based on using Pentane as a blowing agent, as opposed to using CFC, HCFC or HFC, that represent serious risks as ozone depleting substances or substances associated with climate change. Additionally in order to offer the high quality required by the market in terms of resistance and durability, the only options for Talmolder is to reduce the amounts of Pentane wasted by using LP machines. In addition to that, Talmolder is committed to eliminate possible leaks presented in the shafts of the pumps that are used to move the substances inside the plant by replacing allpumps in operation with magnetic coupling ones.

Most of these initiatives are already on their way and therefore the completion of such initiatives will only bring smaller and smaller reductions. Nevertheless, Talmolder's target is to reduce the use of Pentane by 1% in 8 to 12 months.

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	70	
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 (this 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 (other plan)	Methylenebis (phenylisocyanate)
CAS Number	101-68-8
Substance 6 (other plan)	Polymeric diphenylmethane diisocyanate
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 PENTANE

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 water as a blowing agent instead of Pentane

Pentane is being used at Talmolder because it is an alternative to other blowing agents that represent higher environmental risks. Blowing agents such as Chlorofluorocarbons (CFC), Hydro Chlorofluorocarbons (HCFC) present very high Ozone depleting potential (ODP), whereas Hydro Fluorocarbons (HFC) are associated with high global warming potential (GWP). Using water instead of pentane as a blowing agent is another alternative, however the characteristics of the resulting product are very different to what is required by the market. At this point Talmolder has been experimenting with different products, but it is too soon to say whether these alternatives would be feasible replacements in terms of quality. However, Talmolder is committed to explore the feasibility of such products. The estimated reduction for this type of product would be 100%, since they do not contain any Pentane.

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. This alternative is linked to the use of water as a blowing agent. Which as seen before does not meet the quality requirements offered by the products at Talmolder.

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.

4.3 Equipment or Process Modification

4.3.1 Changing the remaining 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, impingement 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 product; therefore very little waste is produced since the amounts are almost exact. Low-pressure dispensing machines dispense a fixed amount of mix 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. Out of these 5 LP machines only one use Pentane as a blowing agent. It is estimated that in average Pentane is 10% of the mix, therefore each shot wasted around 5 cents worth of Pentane.

4.3.1.1 Estimated reductions

Since there are 1 low-pressure (LP) machine and 15 high-pressure (HP) machines, we will assume that all produce the same amount of products. But that LP requires 15% more mix. Therefore the initial amount used is as follows:

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

Where
P_i=Initial amount of Pentane
N_H=Number of HP machines
X_H=Amount pentane used by HP machine
N_L=Number of LP machines
X_L=Amount of Pentane used by LP machines

$$X_L = X_H \times 1.15$$

From these equations we obtain that:

X_H=487 kg
X_L=560 kg

Therefore the reduction would be 73 kg per dispenser

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

Reduction of Pentane use: 73 kg or 0.93%

4.4 Spill and Leak Prevention

4.4.1 Change 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 1% of fluid is loss through the shafts, therefore if the change were to be made, the only savings in Pentane would be less than 79 kg per year, however it is something to be taken into account, because compliance rules regarding other materials such as 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 pentane saved via this option we will assume that 1% of all fluid that is moved by the pumps is lost trough the shafts. Therefore:

Reduction of Pentane use: 7865 kg * 0.01 = 79 kg

4.5 Onsite Reuse or Recycling

4.5.1 Installation of a Pentane Recovery system

There is a possibility to install a pentane recovery system. One such case is mentioned by BuildingGreen.com[2] and refers to a system installed by Elliott Thermodynamics on a Western Insulfoam Plan. According to this article: *"Pentane is captured at a number of locations in the plant and centrally burned to create steam, which is used as process heat for the plant. Unfortunately, because the collection system drives excess air into the burners, gas use of the plant has actually increased somewhat, according to Mike McKenna, Western Insulfoam's Southern Region General Manager, even after accounting for the use of pentane as a fuel. Total cost for the retrofit was about $750,000, according to McKenna."* This case that also provides some values for the costs

[2] http://www.buildinggreen.com/auth/article.cfm/1993/1/1/Reduced-Pentane-Emissions-from-EPS-Production/, Nov 2013

and savings associated with this alternative, which we will use in the analysis.

4.5.1.1 *Estimated reductions*

As per data collected by BuildingGreen.com, Pentane emissions will be reduced by 95%. However, since this Pentane is used to power a boiler for comfort heating, the consumption of Pentane as a blowing agent will remain the same and therefore there will be no effective reduction in the use. Also as per the article, natural gas use increased.

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. We will also assume that each machine uses the same amount of pentane whether it is HP or LP:

Reduction of Pentane use per machine: 7865 kg /20 * 0.1 = 39 kg

5 IMPLEMENTATION OF OPTIONS FOR REDUCTION OF THE USE OF PENTANE AT THE FACILITY

In order to reduce the use of Pentane at the facility, Talmolder has implemented the option described in 4.3.1 as Equipment or Process Modification and the option described on 4.4.1 as Spill and Leak Prevention.

Talmolder already has a HP machine ready for installation, therefore in within the year it is expected that one of the LP machines will be replaced. Table 1 presents a summary of the implementation of the option mentioned on 6.3.1: Replacement of one machine.

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 HP machine	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 Pentane by Implementation of Option 6.3.1

Type	Estimated Reduction in kg	Anticipated Date
Use	73	8-12 months
Creation	0	8-12 months
Release to Air	73	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

Talmolder is also in the process of replacing the remaining mechanical coupling pumps with magnetic coupling ones. The time frames for this are more difficult to estimate, since they depend on the funding that Talmolder can obtain. Table 3 and Table 4 present the timetable and estimated reductions for such option per pump replaced, however at this point in time it is difficult to determine when it would be possible to implement such option.

Table 3 Description and Timetable for Implementation of Option 6.4.1

Step	Description	Estimated Timeline
1	Quotations with different suppliers	1 Month
2	Test and presentation by supplier	1 Month
3	Installation of new pump	1 Month
4	Calibration of equipment and training	1 Month

Table 4 Estimate of Reduction of Pentane by Implementation of Option 6.4.1

Type	Estimated Reduction in kg	Anticipated Date
Use	13	4-6 months
Creation	0	4-6 months
Release to Air	13	4-6 months
Release to Water	0	4-6 months
Release to Land	0	4-6 months
Disposal off-site	0	4-6 months
Disposal on-site	0	4-6 months
Transfer off-site for recycling	0	4-6 months
Contained in Product	0	4-6 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 PENTANE

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

Pentane

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.

Pentane

German Rincon [Planner License # TSRP0197]
General Manager
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