

TOXIC SUBSTANCE REDUCTION PLAN Summary
Particulate Matter PM10 and PM 2.5
for

Multichair, Plant 2
Mississauga, Ontario



Multichair Inc.
6900 Davand Drive
Mississauga, Ontario
Canada L5T 1J5

Plan Summary Statement

This plan summary reflects the content of the toxic substance reduction plan for particulate matter PM₁₀ and PM_{2.5} for Multichair, Plant 2, dated December 23, 2013.

Facility Information

Basic Facility Information		
Facility Name	Multichair Inc.	
NPRI Identification Number	5605	
Number of Full-time Employees	60	
NAICS Code		
Two Digit:	33	Four Digit: 3312 Six Digit:331210
UTM Spatial Coordinates		
UTM Spatial Coordinates		Datum
Latitude:	43 40' 17.77"	NAD83
Longitude:	79 40' 21.70"	

Facility Owner Information

Name	Multichair
Phone Number	905-670-1794
Fax Number	905-565-1577
E-mail	lsimmons@multichair.com
Address	6900 Davand Drive Mississauga, Ontario, L5T 1J5

Facility Operator Information

Name	Brett Burdette
Phone Number	905-670-1794
Fax Number	905-565-1577
E-mail	bberdette@multichair.com
Address	6900 Davand Drive Mississauga, Ontario, L5T 1J5

Highest Ranking Employee Information

Name	Larry Simmons
Title	General Manager
Phone Number	905-670-1794
Fax Number	905-670-1887
E-mail	lsimmons@multichair.com
Address	6900 Davand Drive Mississauga, Ontario, L5T 1J5

Company Information

Legal Name of Parent Company:	Ravenscrest Investments Inc.	893943 Ontario Limited
Address of Parent Company:	c/o 560 Supertest Rd. Downsview, ON, 3MJ 2M6	170 Capital Court, Mississauga, ON, L5T 2R8
Percentage of Facility Owned by Company:	50%	50%
CCRA Business Number:	874774037 RC0001	877262584 RC0001

Toxic Substances for Which the Plan is Prepared:

- Substance 1 (*covered by this plan*): PM₁₀
 - CAS Number: NA
- Substance 2 (*covered by this plan*): PM_{2.5}
 - CAS Number: NA

Plan Contacts

	Person Coordinating the Preparation of the Plan	Person Who Prepared the Plan
Name	Brett Burdette	Ahmed Naderi, P.Eng.
Position	Plant Manager	Principal Engineer
Phone Number	905-670-1794	289-204-0770
Fax Number	905-565-1577	289-204-0771
E-mail	bberdette@multichair.com	a.n@lawenvironmental.com
Address	6900 Davand Drive Mississauga, Ontario, L5T 1J5	15 Wellington Street N., L8R 1M7 Hamilton, Ontario
	Public Contact	Technical Contact
Name	Brett Burdette	Brett Burdette
Position	Plant Manager	Plant Manager
Phone Number	905-670-1794	905-670-1794
Fax Number	905-565-1577	905-565-1577
E-mail	bberdette@multichair.com	bberdette@multichair.com
Address	6900 Davand Drive Mississauga, Ontario, L5T 1J5	6900 Davand Drive Mississauga, Ontario, L5T 1J5

Planner Contact	
Name	Fil Barillaro, P.Eng
Title	Principal Engineer
Phone Number	289-204-0770
Fax Number	289-204-0771
License No.	TSRP0233

Facility's Intent, Objective and Targets

Particulate matter with aerodynamic diameter of 10 µm (PM₁₀) and 2.5 µm (PM_{2.5}) are generated from the facility's induction welding process. Based on a detailed investigation of the composition of the steel grade carried out jointly by Multichair and LAW Environmental, no metallic ingredient (s) of the steel types used at Multichair met the concentration reporting criteria; i.e., trivalent chromium and manganese which were reported under NPRI in previous years were determined to be <1%. As a result, only emissions of particulate matter were found to meet the requirement of Part 4 NPRI reporting criteria.

Intent

Multichair intends to review the possible methods of reducing the discharge of PM₁₀ and PM_{2.5} and implement those options which are beneficial to the company and the community. There are two (2) Phase II toxic substances that require the development of a toxic substance reduction plan based on the criteria set out in the Toxics Reduction Act, 2009 and Ontario Regulation 455/09.

Objectives

Multichair prides itself on technological innovation in order to produce high quality products in an environmentally responsible manner. Multichair is in the business of manufacturing steel tubes and chairs. Further, this plan will determine the technical and economic feasibility of each option to determine which, if any, are viable for implementation at this time. The above toxic substances are created during the facility's induction welding process.

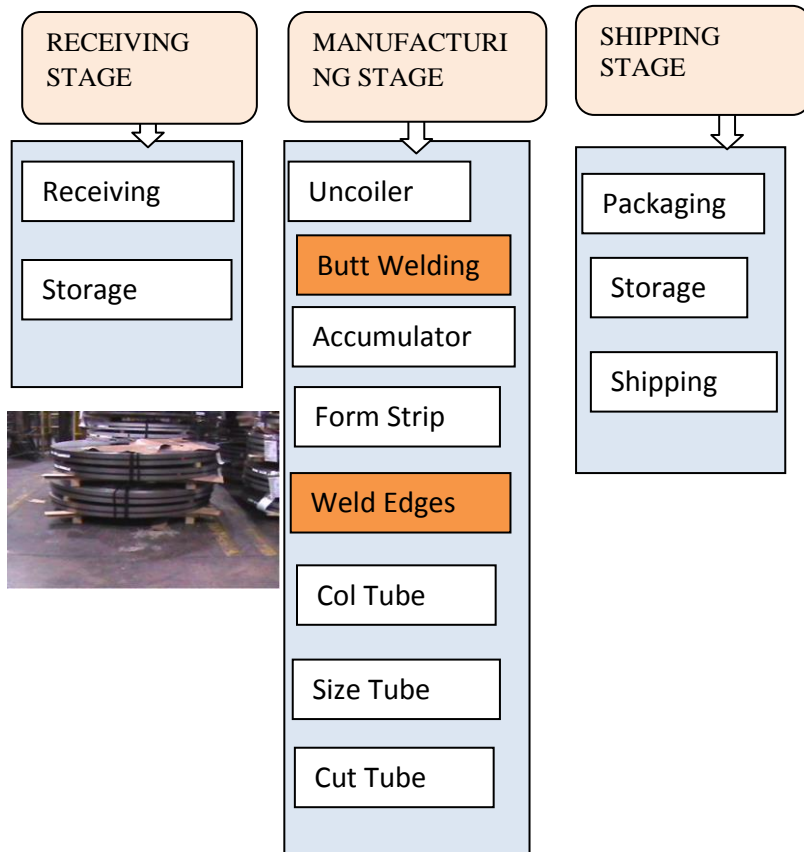
Multichair has reviewed in-depth all the seven categories of toxic substance reduction, as promulgated under Ontario Reg. 455/09 and after going through intensive discussions with the Facility, no reduction option (s) could be realized, as described herein.

Description of the Processes that Create PM₁₀ and PM_{2.5}:

the raw material (steel coil) received by the facility is loaded onto an uncoiler, where the (Flat Strip) is transferred to an accumulator. The coil ends are cut and joined using TIG welding to the next coil. Emission of toxic substances (PM₁₀ and PM_{2.5}) is estimated from this process. The strip is then introduced to the forming mill where it is rolled into a round state. Here, the edges of the tube are welded using induction welding. Emission of toxic substances (PM₁₀ and PM_{2.5}) is estimated from this process. The (Welded Tube) then travels through a cooling bath into a size mill; where the outside diameter is reduced in stages to its final size and shape, as specified by clients.

Toxic Substances Reduction Plan for Year [2011]

The (Finished Sized Tube) is sent through a cut off where the continuous material is cut into specified lengths of tube.



Summary – Quantifications of PM₁₀ and PM_{2.5} from the Facility Operation

Form of involvement	Amount of PM ₁₀ (MT/y)	Amount of PM _{2.5} (MT/y)	Comments
Enters the facility 2011(use):	0	0	--
Created at the facility:	0	0	--
Released (air) from the facility:	2.1602	1.6201	--
Released (land) from the facility:	0	0	--
Released (water) from the facility:	0	0	--
Disposed of (on-site) by the facility:	0	0	--
Disposed of (off-site) by the facility:	0	0	--
Transferred (for recycling) from the facility:	0	0	--
Contained in product that leaves the facility:	0	0	--
Destroyed at the facility (Optional):	N/A	N/A	--

Reduction Options for PM₁₀ and PM_{2.5}

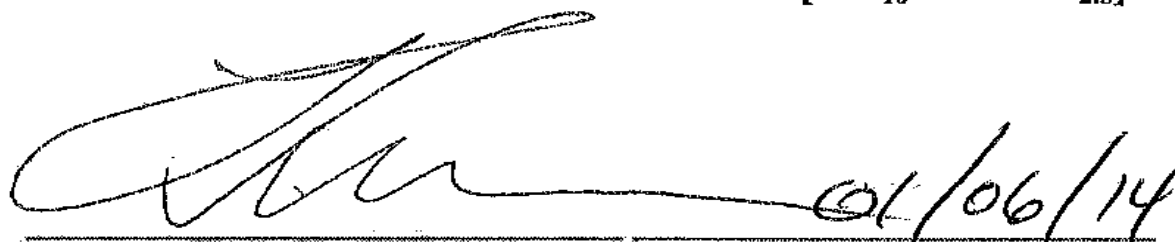
After a thorough examination of the seven categories of toxic substance reduction options and detailed review of the operations, it has been concluded that no possible recommendations for reduction in generation (air release) of PM₁₀ and PM_{2.5} at this facility exist at this current time. Multichair will continue to monitor technological advancements for possible options for future reductions. Written justification is provided.

1. **Material and Feedstock Substitution:** This reduction option is irrelevant, as PM₁₀ and PM_{2.5} are generated from the welding process.
2. **Product Design or Formulation:** No reduction option is identified under this category, as the reported toxic substances are generated from Butt welding (TIG welding) and production welding (Induction welding).
3. **Equipment or Process Modification:** No equipment or process modifications intended for toxic substance reduction could be identified at this time.
4. **Spill and Leak Prevention:** No reduction option is identified under this category, as the toxic substances are airborne and exhausted to the outside environment.
5. **Onsite Reuse or Recycling:** This reduction option is irrelevant.
6. **Improved Inventory Management or Purchasing Technique:** No reduction option(s) can be identified at this time.
7. **Training or Improved Operating Procedures:** No reduction option(s) can be identified at this time.

9.0 Plan Confirmation for PM₁₀ and PM 2.5

As of December 27, 2013, I, Larry Simons, confirm that I have read the toxic substance reduction plan for the toxic substance referred below and I am familiar with its contents. To my knowledge the plan is factually accurate and complies with the Toxics Reduction Act, 2009 and Ontario Regulation 455/09 (General) made under that Act with the exclusion of the Regulatory deadline, the reason for the late submission is that data equitation for the preparation of the plan took longer than expected.

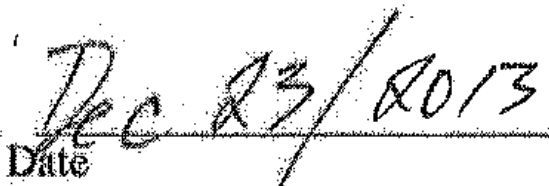
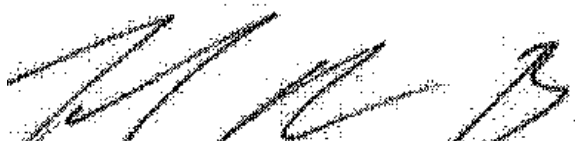
[PM₁₀ and PM 2.5]



Larry Simons; Date
General Manager, Multichair (Highest Ranking Employee)

As of December 23, 2013, I, Fil Barillaro confirm that I am familiar with the processes at Multichair that use or create the toxic substance referred to below, that I agree with the estimates referred to in subparagraphs 7 iii, iv and v of subsection 4 (1) of the Toxics Reduction Act, 2009 that are set out in the plan dated November 30, 2012 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act with the exclusion of the Regulatory deadline.

[PM₁₀ and PM 2.5]



Fil Barillaro, M.A.Sc., P.Eng., QP
Toxic Substance Reduction Planner
Certification Number: TSRP0233

Annual Reporting for PM10 and PM2.5

Toxic Substances Annual Reporting for Year [2012]

Form of involvement	Amount of PM ₁₀ (MT/y)	Amount of PM _{2.5} (MT/y)	Comments
Enters the facility 2012(use):	0	0	--
Created at the facility:	0	0	--
Released (air) from the facility:	2.1602	1.602	--
Released (land) from the facility:	0	0	--
Released (water) from the facility:	0	0	--
Disposed of (on-site) by the facility:	0	0	--
Disposed of (off-site) by the facility:	0	0	--
Transferred (for recycling) from the facility:	0	0	--
Contained in product that leaves the facility:	0	0	--
Destroyed at the facility (Optional):	N/A	N/A	--

Plant 2, Year 2012

Multichair's previous consultant reported the facility's activities under NPRI and TRA for the following substances:

- i. Manganese and its compounds (Mn);
- ii. Chromium and its compounds (Cr); and
- iii. Particulate matter with aerodynamic diameter of 10 micron and less (PM10)

LAW Environmental applied for an exit record for Mn and Cr under TRA and reported the following substances under NPRI and TRA.

- i. Particulate matter with aerodynamic diameter of 10 micron and less (PM10);
- ii. Particulate matter with aerodynamic diameter of 2.5 micron and less (PM2.5)

In compliance with the requirements of O.Reg 455/09, LAW Environmental prepared a Toxic Substances Reduction (TSR) plan on behalf of Multichair. A copy of the TSR plan summary was uploaded on Multichair's website.

Plant 2 Reporting, Year 2012				
Substances	Used (MT/y)	Contained in Product (MT/y)	Air Release (MT/y)	Recycled (MT/y)
Mn	ER	ER	ER	ER
Cr	ER	ER	ER	ER
PM10	N/A	N/A	2.1602	N/A
PM2.5	N/A	N/A	1.602	N/A

Note:

ER: exit record applied, data was unavailable

Estimation of PM10 and PM2.5 Release from Butt Welding

It was reported that the ends of the uncoiled steel are cut off and joined using TIG welding. Based on the information provided by the facility; 80% of the finished tubes are (3/4 inches to 1.5 inches OD) and the reported thickness of the tubes ranged from 0.040 inches to 0.069 inches. For the purposes of estimating molten volume of the weld (thickness x width x length), the following data is used:

Total number of coils ran in year 2011 for both Plant 1 and Plant 2. 11760 coils

Distribution of imported coils the plants: Plant 2: 90.4%; Plant 1: 9.6%

A: total number of coils ran in year 2011 for Plant 2. 11760 coils x 90.4% = 10631

B: mean thickness: $((0.040 + 0.069)/2)$ inches; 0.0014 m

b: mean diameter of the tube $(3/4 + 1.5)/2$ inches : 1.125 inches = 0.029 m

C: avg perimeter of the tubes (width of the tubes): 0.029 m x pi = 0.029 x 3.14 = 0.1 m

D: total cut length (A x C); (10631) x 0.1 m = 1063.1 m

E: mean seam width; (each end of the tube fused): 0.5 mm, total width: 0.5 mm x 2 = 1 mm

F: volume of molten weld seam; (D x E x B); 1063.1 x (1/1000) x 0.0014 = 0.0015 m³

G: steel density: 7.85 tonnes/m³

H: mass of the molten weld seam: F x G = 0.012 tonnes

EF: PM₁₀ emission factor is 1.5% of the mass of the weld seam; based on USEAPA FIRE data

$E_{PM10} = EF \times H = 1.5\% \times 0.012 \text{ tonnes} = 0.0002 \text{ MT /y}$

I = 75% of PM₁₀

$E_{PM2.5} = E_{PM10} \times 75\% = 0.0002 \times 0.75 = 0.0001 \text{ MT /y}$

Estimation of PM10 and PM2.5 Release from Induction Welding

For the emission of welding fume from the induction welding, production data provided for the butt welding is used to estimate emission of welding fume from the this process.

Total number of coils ran in year 2011 for both Plant 1 and Plant 2. 11760 coils

Total length of coils = 14497076 m

Distribution of imported coils the plants: Plant 2: 90.4%; Plant 1: 9.6%

A: total number of coils ran in year 2011 for Plant 2 . 11760 coils x 90.4% = 10631

B: mean thickness: $((0.040 + 0.069)/2)$ inches; 0.0014 m

C: total length of coils = 14497076 x 90.4% = 13105356.7 m

D: mean seam width; (each end of the tube fused): 0.5 mm, total width: 0.5 mm x 2 = 1 mm

E: volume of molten weld seam; (B x C x D); 13105356.7 x (1/1000) x 0.0014 = 18.348 m³

F: steel density: 7.85 tonnes/m³

G: mass of the molten weld seam: $E \times G = 18.348 \times 7.85 = 144.029$ MT/y

EF: PM₁₀ emission factor is 1.5% of the mass of the weld seam; based on USEAPA FIRE data

$E_{PM\ 10} = EF \times G = 1.5\% \times 144.029$ tonnes = 2.160 MT /y

I = 75% of PM₁₀

$E_{PM\ 2.5} = E_{PM\ 10} \times I = 2.160 \times 75\% = 1.620$ MT /y

Annual Reporting for PM10 and PM2.5

Toxic Substances Annual Reporting for Year [2013]

Form of involvement	Amount of PM ₁₀ (MT/y)	Amount of PM _{2.5} (MT/y)	Comments
Enters the facility 2013(use):	0	0	--
Created at the facility:	0	0	--
Released (air) from the facility:	2.104	1.57	--
Released (land) from the facility:	0	0	--
Released (water) from the facility:	0	0	--
Disposed of (on-site) by the facility:	0	0	--
Disposed of (off-site) by the facility:	0	0	--
Transferred (for recycling) from the facility:	0	0	--
Contained in product that leaves the facility:	0	0	--
Destroyed at the facility (Optional):	N/A	N/A	--

Plant 2, Reporting Year 2013

LAW Environmental reported Plant 2 activities under NPRI and TRA for the following substances:

- iii. Particulate matter with aerodynamic diameter of 10 micron and less (PM10);
- iv. Particulate matter with aerodynamic diameter of 2.5 micron and less (PM2.5)

Plant 2 Reporting, Year 2013				
Substances	Used (MT/y)	Contained in Product (MT/y)	Air Release (MT/y)	Recycled (MT/y)
PM10	N/A	N/A	2.104	N/A
PM2.5	N/A	N/A	1.578	N/A

Plant 1, Reporting Year 2013

LAW Environmental reported Plant 1 activities under NPRI and TRA for the following substance:

- Hexavalent chromium and its compounds

Plant 1 Reporting, Year 2013					
Substances	Used (kg/y)	Contained in Product (kg/y)	Air Release (kg/y)	hailed offsite (kg/y)	S.sewer Discharge (kg/y)
Cr(VI)	474.4	N/A	2.016	0.0591	0.0142

Note:

Cr (VI): Hexavalent Chromium

For the purposes of estimating quantity of Cr(VI) hauled off site and discharged from the facility's onsite wastewater treatment (WWT) plant, a representative sample was collected from the filter press and WWT plant discharge. The samples were submitted to an independent environmental laboratory for analysis of Cr(VI). A copy of the analytical results is included in Appendix B.

Cr (VI) Air Release Calculations

Emission Factor for Cr (VI): 0.007776 g/amp/hr, uncontrolled emission factor;
 Current density: 122 amp/ft²;
 Tank surface area: 12.25 ft²;
 Annual operating hrs: 1728 hr/y;

Emission of Cr(VI): $0.007776 \text{ g/amp/hr} \times 122 \text{ amp/ft}^2 \times 12.25 \text{ ft}^2 \times (3000 \text{ hr/y}) \times (1 \text{ kg}/1000 \text{ g})$
 20.2 kg/y

Scrubber removal efficiency: 90%
 Release: 2.0 kg/y

Cr (VI) Water Discharge Calculations

Total reported volume of water discharged from WWT: 162,946 litres;
 Analytical results: 87 µg/L;
 Cr(VI) release in sanitary sewer: $162,946 \text{ litres} \times 87 \text{ µg/L} (1/10^9) = 0.014 \text{ kg/y}$

Cr (VI) Hauled offsite Calculations

Total reported weight of filter press cake hauled offsite: 13.670 MT/y;
 Analytical results: 4.32 µg/g;
 Cr(VI) hauled offsite: $13,670,000 \text{ g} \times 4.32 \text{ µg/g} \times (1/10^9) = 0.059 \text{ kg/y}$