TOXIC REDUCTION PLAN

MANGANESE

Prepared For:
Camtac Manufacturing

Prepared by:
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1.0 INTRODUCTION

1.1 BASIC FACILITY INFORMATION

Example table of basic facility information:

Name & CAS # of Substance	Manganese	7439-96-5
Facility Identification and Site Address		
Company Name	Linamar Corporation	
Facility Name	Camtac Manufacturing	
Facility Address	**Physical Address:**	**Mailing Address: (if different)**
	148 Arrow Road Guelph, Ontario N1K 1T4	
Spatial Coordination of Facility	Easting: 556618.56 Northing: 4822974.18	
Number of Employees	446	
NPRI ID	10942	
Ontario MOE ID Number		
Parent Company (PC) Information		
PC Name & Address	Linamar Corporation, 287 Speedvale Avenue West, Guelph, Ontario N1H 1C5	
Percent Ownership for each PC	100%	
Business Number for PC	103333662	
Primary North American Industrial Classification System Code (NAICS)		
2 Digit NAICS Code	33 Manufacturing	
4 Digit NAICS Code	3336 – Engine, turbine and power transmission equipment manufacturing	
6 Digit NAICS Code	333619 – Other engine and power transmission equipment manufacturing	
Company Contact Information		
Facility Public Contact	Mr. Stu Burbidge, LPS, sigma, PM Manager	
	stu.burbidge@linamar.com	
	Phone: (519) 780-2270 ext. 318	Same address as facility
	Fax: (519) 780-2274	
Facility Technical Contact	Mr. Bert Huntley, EHS Specialist	
	bert.huntley@linamar.com	
	Phone: (519) 780-2270 ext. 269	Same address as facility
	Fax: (519) 780-2274	

Company Coordinator **Contact**	Mr. Bert Huntley, EHS Specialist	
	bert.huntley@linamar.com	
	Phone: (519) 780-2270 ext. 269	Same address as facility
	Fax: (519) 780-2274	
Person who Prepared the Plan: (if different from the Coordinator)	Ms. Dana Lauder, Consultant	Conestoga-Rovers & Associates
	dlauder@craworld.com	651 Colby Drive
	Phone: (519) 884-0510 ext. 2299	Waterloo, Ontario
	Fax: (519) 884-0525	N2V 1C2
Highest Ranking Employee	Mr. Andy Scapinello, Operations Manager	
	andy.scapinello@linamar.com	
	Phone: (519) 780-2270	Same address as facility
	Fax: (519) 780-2274	
Planner Information:		
Planner Responsible for Making Recommendations	Ms. Dana Lauder, Consultant	Conestoga-Rovers & Associates
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	Ms. Dana Lauder, Consultant	Conestoga-Rovers & Associates
Planner Responsible for Certification	Ms. Dana Lauder, Consultant	Conestoga-Rovers & Associates
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1.2 STATEMENT OF INTENT

Camtac Manufacturing (Camtac) is committed to playing a leadership role in protecting the environment. Whenever feasible, we will reduce the use of manganese in compliance with all Federal and Provincial Regulations.

1.3 OBJECTIVES

Camtac prides itself on technological innovation in order to produce high quality automotive parts in an environmentally responsible manner. Through this plan, Camtac determine the technical and economic feasibility of each option to determine which, if any, are viable for implementation at this time.

1.4 FACILITY DESCRIPTION

Camtac Manufacturing produces automotive parts from steel forgings. Raw materials (steel parts) are brought to the facility where they are machined into automotive parts, then washed and packaged for shipment. These raw materials contain the compound manganese as a constituent material.

2.0 IDENTIFICATION AND DESCRIPTION

2.1 STAGES AND PROCESSES

Manganese is present in the raw steel materials used in the process as a constituent compound. The stages and processes that involve manganese are as follows:

- Manganese, as a constituent of the raw steel material, is received in the Receiving Process in the Receiving Stage, where it is stored as required by customers. It is then transferred into the Manufacturing Stage. This stage and the quantification methods for Manganese are further described in Section 3.1.
- In the Manufacturing Stage, the raw materials are sent through a variety of separate processes which produce the various automotive parts. The different processes which are involved in this stage are listed in the Process Flow Diagram in Section 2.2. Of these processes, Manganese is used in the Machining Process.
- In the Shipping Process of the Shipping Stage, the finished products are inspected and then packaged for shipment to the various customers. Manganese is contained in the final product.

In 2011, the facility operated 24 hours a day, 6 days a week.

2.2 PROCESS FLOW DIAGRAM

A process flow diagram of the stages as described above is presented below (the processes which involve the use of manganese are highlighted):

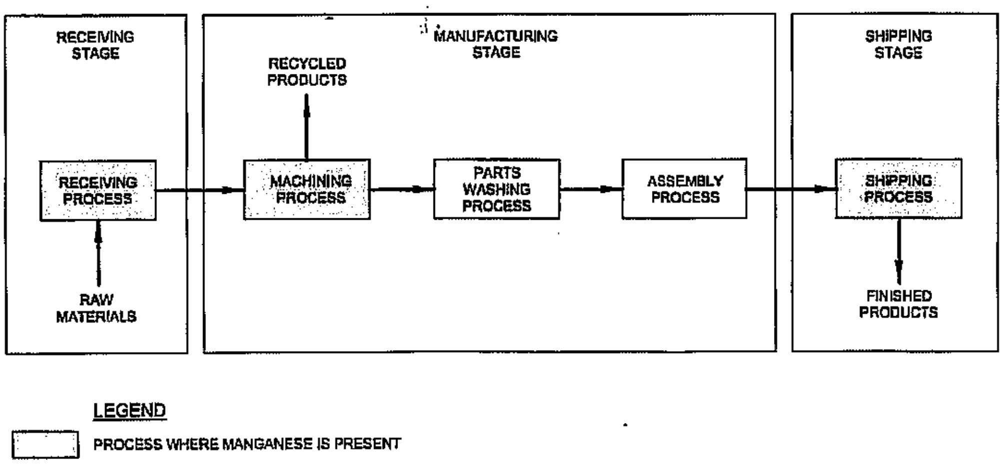

Figure 1: Main Process Flow Diagram

Raw Material Quantities

The total amount of each raw material used in the process was determined based on purchasing and inventory records which are tracked by Camtac's accounting system. Quantities of raw materials that are used in the process are recorded through purchasing and inventory records. This data is therefore considered to be very reliable.

3.1.1.3 QUANTIFICATION OF TOXIC SUBSTANCE

Table 1: Calculation of Manganese used in Receiving Process

Product	*Manganese Composition (%)*	*Number of Parts Made (#/year)*	*Raw weight of part (kg/part)*	*Quantity Used in 2011 (kg/year)*	*Total Manganese Used (kg/year)*
C7 Bus. Unit	0.8	27,631	118.8	3,282,563	24,619.2
C9 Bus. Unit	0.8	21,809	134.7	2,938,041	22,035.3
C9 – Tier 4	0.8	816	134.7	109,929	824.47
C13 Bus. Unit(1)	0.8	23,481	204.6	4,803,512	36,026.3
C15 Bus. Unit(1)	0.8	21,174	249.9	5,292,005	39,690.0
C32 Bus. Unit	0.8	19,465	280.8	5,465,259	40,989.4
NAV (Int & N13)	0.8	34,561	184.6	6,380,378	47,852,.8
Fuel Nozzle	80.0	92,571	1.01	93,637	74,909.3
3500	0.9	25,316	54.88	1,389,342	12,504.1

(1) These two product lines will end production in June 2013, to be replaced by a new product line which will be implemented at a later date. The quantity of Manganese processed by these new lines is unknown at this time.

U1 = Manganese used in receiving process in 2011
= 24,619.2 kg + 22,035.3 kg + 824.47 kg + 36,026.3 kg + 39,690.0 kg + 40,989.4 kg + 47,852.8 kg + 74,909.3 kg + 12,504.1 kg
= 299,451.0 kg

3.1.2 RECEIVING PROCESS (CONTAINED IN PRODUCT)

3.1.2.1 TRACKING AND QUANTIFICATION METHOD

Quantification Method: Mass Balance – see Section 3.1.1.1

3.1.2.2 BEST AVAILABLE METHOD RATIONALE

Manganese Concentration in Raw Materials

See Section 3.1.1.2

Raw Material Quantities

See Section 3.1.1.2

3.1.2.3 QUANTIFICATION OF TOXIC SUBSTANCE

The quantification of the amount contained in product was assumed to be equal to the amount that was delivered to the facility, as all material delivered to the site entered the Manufacturing Stage.

P1 = Manganese contained in product in Receiving Stage: 299,451.0 kg

3.1.3 INPUT/OUTPUT BALANCE

Use + Creation = Transformed + Destroyed + Contained in Product + On-Site or Off-Site Release (to Air, Land, Water) +Offsite Transfers (for treatment, recycling) + Disposals

Note: This stage only contains materials used and material contained in product (to next stage)

U1 = P1

299,451.0 kg = 299,451.0 kg

Unaccounted Material = 0 kg

3.2 MACHINING PROCESS DESCRIPTION

The raw materials, after being processed in the Receiving Stage, are transferred into the process (U2). The raw materials are then sent through a variety of equipment which cut and shape the materials into the general configurations, as dependent on the final product(s). The waste materials from this process are collected from the process and transferred off site for recycling (R1). The finished products from this process are then transferred to the Parts Washing process (P2). Once the materials leave this process, they go through a variety of process (as shown on Figure 1) - there is no change in the quantity of manganese through any of these processes.

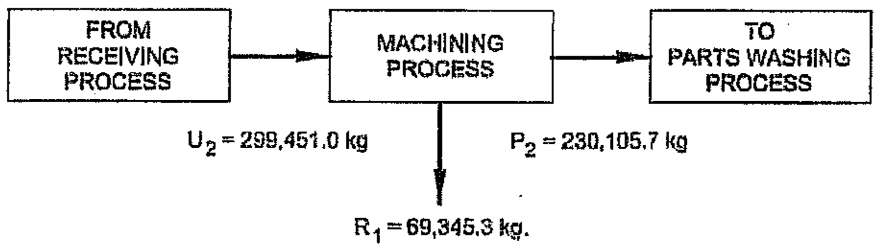

Figure 3: Machining Process Flow Diagram

3.2.1 MACHINING PROCESS (USE)

3.2.1.1 TRACKING AND QUANTIFICATION METHOD

Quantification Method: Mass Balance - The amount of manganese used in the Machining process was assumed to be the same as the amount contained in product following the Receiving Process (see Section 3.1.1.1)

3.2.1.2 BEST AVAILABLE METHOD RATIONALE

Manganese Concentration in Raw Materials

See Section 3.1.1.2.

Raw Material Quantities

See Section 3.1.1.2.

3.2.1.3 QUANTIFICATION OF TOXIC SUBSTANCE

The quantification of the amount used in process was assumed to be equal to the amount that was delivered to the facility, as all material delivered to the site entered the Manufacturing Stage.

U2 = Manganese used in Machining Process: 299,451.0 kg

3.2.2 MACHINING PROCESS (OFF-SITE TRANSFERS)

3.2.2.1 TRACKING AND QUANTIFICATION METHOD

Quantification Method: Mass Balance - based on records of the materials transferred off site. It is assumed that the materials transferred off site consist of the same materials as enters the process.

3.2.2.2 BEST AVAILABLE METHOD RATIONALE

Manganese Concentration in Recycled Quantities

See Section 3.1.1.2.

Recycled Quantities

The total quantity of material transferred off site is calculated based on the summation of the total material which is removed from the parts during the Machining process and the total mass machined parts which are scrapped (for various reasons) before they enter the next process. These quantities are calculated based on the number of parts made in total, the number of parts sent to scrap, and the raw and finished weight of each part produced (in kilograms), as described by the following equation:

$$P = N_{made} \times (RW - FW) + N_{scrap} \times FW$$

Where:

P	=	The total amount of each material contained in the product (kg/year)
N_{made}	=	Total number of each part produced (including parts sold and parts scrapped) (# of parts/year)
RW	=	Raw weight of each part produced (kg/part)
FW	=	Finished weight of each part produced (kg/part)
N_{scrap}	=	Total number of each part scrapped (# of parts/year)

The quantity of Manganese which is recycled is then determined by multiplying the quantity of each part recycled by its respective concentration.

Quantities of materials that are used in the process and scrapped are recorded through purchasing and inventory records. This data is therefore considered to be very reliable.

3.2.2.3 QUANTIFICATION OF TOXIC SUBSTANCE

Table 2: Calculation of Manganese Recycled Off Site

Product	*Manganese Composition (%)*	*Number of Parts Made (#/year)*	*Number of Parts Scrapped (#/year)*	*Raw weight of part (kg/part)*	*Finished weight of part (kg/part)*	*Quantity Recycled in 2011 (kg/year)*	*Total Manganese Recycled (kg/year)*
C7 Bus. Unit	0.8	27,631	552	118.8	108.4	347,199	2,604.0
C9 Bus. Unit	0.8	21,809	348	134.7	108.4	611,485	4,586.1
C9 – Tier 4	0.8	816	816	134.7	108.4	109,929	824.47
C13 Bus. Unit(1)	0.8	23,481	933	204.6	148.3	1,459,086	10,943.1
C15 Bus. Unit(1)	0.8	21,174	411	249.9	178.7	1,586,699	11,900.2
C32 Bus. Unit	0.8	19,465	845	280.8	219.1	1,385,895	10,394.2
NAV (Int & N13)	0.8	34,561	764	184.6	166.0	769,576	5,771.2
Fuel Nozzle	80.0	92,571	1,072	1.01	0.78	22,666.0	18,132.8
3500	0.9	25,316	4,316	54.88	43.998	465,384	4,188.5

(1) These two product lines will end production in June 2013, to be replaced by a new product line which will be implemented at a later date. The quantity of Manganese processed by these new lines is unknown at this time.

<u>R1</u> = Manganese used in Machining process in 2011
= 2,604.0 kg + 4,586.1 kg + 824.47 kg + 10,943.1 kg + 11,900.2 kg + 10,394.2 kg + 5,771.2 kg + 18,132.8 kg + 4,188.5 kg
= <u>69,345.3</u> kg

3.2.3 MACHINING PROCESS (CONTAINED IN PRODUCT)

3.2.3.1 TRACKING AND QUANTIFICATION METHOD

<u>Quantification Method</u>: Mass Balance – based on balance of materials used in process and amount sent to recycling

3.2.3.2 BEST AVAILABLE METHOD RATIONALE

<u>Manganese Concentration in Raw Materials</u>

See Section 3.1.1.2

Raw Material Quantities

See Section 3.2.1.2 and 3.2.2.2

3.2.3.3 QUANTIFICATION OF TOXIC SUBSTANCE

The quantification of the amount contained in product was calculated based on a mass balance of the amount used in the process (U2) and the amount transferred off site from this process (R1).

P2 = Manganese contained in product in Machining Process: 230,105.7 kg

3.2.4 INPUT/OUTPUT BALANCE

Use + Creation = Transformed + Destroyed + Contained in Product + On-Site or Off-Site Release (to Air, Land, Water) +Offsite Transfers (for treatment, recycling) + Disposals

U2 = P2 + R1

299,451.0 kg = 230,105.7 kg + 69,345.3 kg

299,451.0 kg = 299,451.0 kg

Unaccounted Material = 0 kg

3.3 SHIPPING PROCESS DESCRIPTION

The Shipping Stage consists of the Shipping Process. After completing the Manufacturing Stage, the finished products are transferred (U3) to the inspection and packaging area, where the parts are inspected by facility personnel, then packaged and stored on site before being shipped onto customers (P3).

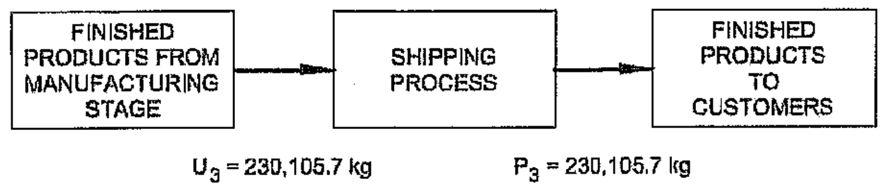

Figure 4: Shipping Process Flow Diagram

3.3.1 SHIPPING PROCESS (USE)

3.3.1.1 TRACKING AND QUANTIFICATION METHOD

Quantification Method: Mass Balance - The amount of manganese used in the Shipping process was assumed to be the same as the amount contained in product following the Machining Process (see Section 3.2.3.1).

3.3.1.2 BEST AVAILABLE METHOD RATIONALE

Manganese Concentration in Raw Materials

See Section 3.1.1.2.

Raw Material Quantities

See Section 3.2.3.2.

3.3.1.3 QUANTIFICATION OF TOXIC SUBSTANCE

U3 = Manganese used in Shipping process in 2011: 230,105.7 kg

3.3.2 SHIPPING PROCESS (CONTAINED IN PRODUCT)

3.3.2.1 TRACKING AND QUANTIFICATION METHOD

Quantification Method: Mass Balance – see Section 3.3.1.1

3.3.2.2 BEST AVAILABLE METHOD RATIONALE

Manganese Concentration in Raw Materials

See Section 3.1.1.2

Raw Material Quantities

See Section 3.3.1.2

3.3.2.3 QUANTIFICATION OF TOXIC SUBSTANCE

The quantification of the amount contained in product was assumed to be equal to the amount used in the process, as no material is transferred out of this process.

P3 = Manganese contained in product in Shipping Process: 230,105.7 kg

3.3.3 INPUT/OUTPUT BALANCE

Use + Creation = Transformed + Destroyed + Contained in Product + On-Site or Off-Site Release (to Air, Land, Water) +Offsite Transfers (for treatment, recycling) + Disposals

Note: This stage only contains materials used and material contained in product (to next stage)

U3 = P3

230,105.7 kg = 230,105.7 kg

Unaccounted Material = 0 kg

4.0 FACILITY-WIDE ACCOUNTING INFORMATION

4.1 USE

The total facility wide use is equal to the amount of manganese which is contained in the raw materials which is received from the suppliers in 2011.

Facility Wide Use = U1 = 299,451.0 kg

4.2 CREATION

There were zero creations of manganese on site in 2011.

4.3 TRANSFORMATION

There were zero transformations of manganese on site in 2011.

4.4 DESTRUCTION

There were zero destructions of manganese on site in 2011.

4.5 CONTAINED IN PRODUCT

The total facility wide amount of manganese contained in product in 2011 is equal to the amount contained in the each product which is shipped off site.

Facility Wide Contained in Product = P3 = 230,105.7 kg

4.6 RELEASES TO AIR

There were zero releases to air of manganese on site in 2011.

4.7 RELEASES TO LAND

There were zero releases to land of manganese on site in 2011.

4.8 RELEASES TO WATER

There were zero releases to water of manganese on site in 2011.

4.9 DISPOSALS (ON SITE)

There were zero on-site disposals of manganese in 2011.

4.10 DISPOSALS (OFF SITE)

There were zero off-site disposals of manganese in 2011.

4.11 OFF-SITE TRANSFERS (TREATMENT OR RECYCLING)

The total amount transferred off site is equal to the amount contained in the material sent for recycling, as documented in Section 3.2.

Facility Wide Offsite Transfers (Recycling) = R1

= 69,345.3 kg

5.0 DIRECT AND INDIRECT COST ANALYSIS

Of the costs associated with the Manufacturing process, the only cost which can be directly associated with Manganese is the material cost. Of this cost, Camtac has calculated a cost of $422,401 which is associated with manganese. For all other direct and indirect costs (equipment maintenance, utilities, labour, etc.), the total associated cost would be incurred regardless if manganese was present or not and it would not be affected by the presence or lack-thereof of manganese in the products.

These values were obtained from the accounting department at the close of the month of December in 2011.

6.0 TOXIC SUBSTANCE USE AND CREATION REDUCTION OPTIONS

6.1 MATERIAL OR FEEDSTOCK SUBSTITUTION OPTIONS

6.1.1 IDENTIFICATION OF OPTIONS

The materials used in the process are determined based on requirements specified by Camtac's customers. Camtac does not have any control over the materials which are used in the process. Therefore, no possible reduction options were identified in this category that would result in the reduction in the use of Manganese.

6.1.2 ESTIMATED REDUCTIONS

Not applicable.

6.1.3 TECHNICAL FEASIBILITY

Not applicable.

6.1.4 ECONOMIC FEASIBILITY

Not applicable.

6.2 PRODUCT REDESIGN OR REFORMULATION

6.2.1 IDENTIFICATION OF OPTIONS

The specifications of the final products are determined by Camtac's customers. The customer specifies product configurations. Camtac does not have any control over the design of the products. Therefore, no possible reduction options were identified in this category that would result in a reduction in the use of Manganese.

6.2.2 ESTIMATED REDUCTIONS

Not applicable.

6.2.3 TECHNICAL FEASIBILITY

Not applicable.

6.2.4 ECONOMIC FEASIBILITY

Not applicable.

6.3 EQUIPMENT OR PROCESS MODIFICATIONS

6.3.1 IDENTIFICATION OF OPTIONS

The equipment used at the facility is optimized to ensure that a minimum amount of scrap is produced (subject to the personnel operating the equipment at any given time). Therefore, no possible reduction options were identified in this category that would result in a reduction in the use of Manganese.

6.3.2 ESTIMATED REDUCTIONS

Not applicable.

6.3.3 TECHNICAL FEASIBILITY

Not applicable.

6.3.4 ECONOMIC FEASIBILITY

Not applicable.

6.4 SPILL AND LEAK PREVENTION

6.4.1 IDENTIFICATION OF OPTIONS

All Manganese used in the raw materials at the Facility is contained in metals. Spill and leak prevention is not a concern and no possible reduction options were identified in this category that would result in a reduction in the use of Manganese.

6.4.2 ESTIMATED REDUCTIONS

Not applicable.

6.4.3 TECHNICAL FEASIBILITY

Not applicable.

6.4.4 ECONOMIC FEASIBILITY

Not applicable.

6.5 ON-SITE REUSE AND RECYCLING

6.5.1 IDENTIFICATION OF OPTIONS

All metal scrap generated at the Facility is recycled. The metal scrap cannot be reused in the process as it is not in a form which would allow it to be used (i.e. it is too small or it is misshaped). Therefore, no possible reduction options were identified in this category that would result in a reduction in the use of Manganese.

6.5.2 ESTIMATED REDUCTIONS

Not applicable.

6.5.3 TECHNICAL FEASIBILITY

Not applicable.

6.5.4 ECONOMIC FEASIBILITY

Not applicable.

6.6 IMPROVED INVENTORY MANAGEMENT/ PURCHASING TECHNIQUES

6.6.1 IDENTIFICATION OF OPTIONS

It was identified that a product redesign or reformulation reduction option would be the elimination of Foundry Defects that are machined in the process by working with the supplier to reduce these materials. This would be implemented through discussions with the suppliers to discuss methodologies to reduce the amount of defective material delivered.

6.6.2 ESTIMATED REDUCTIONS

For 2011, Camtac determined that 5.82 percent of all raw material delivered to the facility was defective (foundry defects) and would then be sent to recycling. With a total Manganese usage of 299,451.0 kg, this corresponds to 17,428.0 kg of Manganese in Foundry defects. Camtac has targeted a reduction in foundry defects by 2 percent - this would then correspond to a reduction in Manganese used and recycled of 5,989.02 kg.

6.6.3 TECHNICAL FEASIBILITY

As this potential change does not result in any significant changes to the process, it is technically feasible.

6.6.4 ECONOMIC FEASIBILITY

As there are no technical changes that are required for this option, this option has no costs associated with it. The potential savings are equal to the reduction in the value of material which is sent as foundry scrap. In 2011, the total value of the foundry scrap was $3,786,560 - by reducing this value by 2 percent, Camtac has estimated that there will be a savings of $75,731. This corresponds to an immediate payback period. Therefore, this option is economically feasible.

6.7 TRAINING OR IMPROVED OPERATING PRACTICES

6.7.1 IDENTIFICATION OF OPTIONS

A potential option that was identified was to implement improved procedures and practices amongst the machine operators which would increase consistency amongst the machine operators, thus reducing the amount of raw materials which are scrapped. This would include daily line meetings with the operators, and holding FTQ (First Time Quality) meetings more often to pinpoint particular areas where scrap can be reduced.

6.7.2 ESTIMATED REDUCTIONS

Based on 2011 levels, the average amount of material which was recycled as scrap was 0.7 percent - with this reduction implemented, the average scrap rate target would be to reduce this to 0.25 percent. For 2011, based on the total Manganese used of 299,451.0 kg, this will result in 2,096.2 kg of Manganese scrapped. Applying the above reduction, the amount of Manganese scrapped would have been, 748.6 kg, which is a reduction of 1,347.6 kg in Manganese used and Manganese recycled.

6.7.3 TECHNICAL FEASIBILITY

As this potential change does not result in any significant changes to the process, it is technically feasible.

6.7.4 ECONOMIC FEASIBILITY

It is anticipated that implementing this option will not require any significant changes to the overall process - additional meetings will be required and there is potential for new tooling to be purchased (for consistency amongst operators), but these labour and materials costs are expected to be minor. The potential savings are equal to the reduction in the value of material which is sent as scrap. In 2011, the value of this scrap was $611,954 based on a scrap percentage of 0.70 percent for 2011. By reducing this value from 0.7 percent to 0.25 percent, Camtac has estimated that there will be a savings of $275,379. This corresponds to an immediate payback period. Therefore, this option is economically feasible.

The economic feasibility of this option is discussed in Section 6.3.4.

7.0 OPTIONS TO BE IMPLEMENTED

The following option has been identified for implementation to reduce the use and/or amount of manganese transferred:

- Work with suppliers to reduce Foundry Defective materials
- Reduce scrap levels on production lines by 0.25 percent

Work with suppliers to reduce Foundry Defective materials

This option is an on-going procedure at Camtac, with annual reduction targets that will change from year to year. The schedule for this reduction option is given below:

Step	Description	Estimated Timelines
1	Discussions with Foundry Suppliers.	January 2013 - Ongoing
2	Implement improvements to materials receiving procedure	
3	Timeline for implementation of Manganese Reductions	End of 2013

Reduce scrap levels on production lines by 0.25 percent

This option is an on-going procedure at Camtac, with annual reduction targets that will change from year to year. The schedule for this reduction option is given below:

Step	Description	Estimated Timelines
1	Review of existing scrap procedures to identify possible improvements	January 2013 - Ongoing
2	Hold Annual Session to update operators based on new findings	Annual
3	Timeline for implementation of Manganese Reductions	End of 2013

Camtac has carefully reviewed the toxic substance use reduction options to ensure that there is no net negative impact to the environment or public health. The selected options will serve to reduce the amount of manganese used in the process, and will not create any toxic by-products.

8.0 PLANNER RECOMMENDATIONS AND RATIONALE

The Planner's recommendations and rationale for these recommendations have been appended to the Plan and are provided in Appendix A.

9.0 PLAN CERTIFICATIONS

CERTIFICATION BY HIGHEST RANKING EMPLOYEE

As of December 17, 2012, I, Andy Scapinello, 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 factually accurate and complies with the *Toxics Reduction Act, 2009* and Ontario Regulation 455/09 (General) made under that Act.

Manganese

Andy Scapinello
Operations Manager
Camtac Manufacturing

CERTIFICATION BY LICENSED PLANNER

As of December 17, 2012, I, Dana Lauder, certify that I am familiar with the processes at Camtac 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 23, 2012 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Manganese

Dana Lauder [Planner License #TSRP00014]
Consultant
Conestoga-Rovers & Associates Ltd.

APPENDIX A

PLANNER RECOMMENDATIONS

CONESTOGA-ROVERS
& ASSOCIATES

651 Colby Drive, Waterloo, Ontario, N2V 1C2
Telephone: (519) 884-0510 Fax: (519) 884-0525
www.CRAworld.com

December 17, 2012 Reference No. 035634

Mr. Bert Huntley
Camtac Manufacturing, a division of Linamar Holdings Inc.
148 Arrow Road
Guelph, Ontario
N1K 1T4

Dear Mr. Huntley:

Re: Toxics Reduction Plan - Manganese – Planner Recommendations

1.0 INTRODUCTION

The Toxics Reduction Act and Ontario Regulation (O. Reg.) 455/09 require that each toxic substance reduction plan be reviewed and certified by a Certified Toxic Substance Reduction Planner (Planner). Section 18 of O. Reg. 455/09 also requires the Planner to provide recommendations, with supporting rationale, for the purposes of improving all aspects of the plan including the potential for reducing the use and creation of the toxic substance at the facility and the business rationale for implementing the plan.

The Planner is required to provide recommendations for any of the following relevant issues, or a written explanation of why a recommendation is not necessary:

1. Whether improvements could be made in the expertise relied on in preparing the plan
2. Whether improvements could be made in:
    i. The data and methods used for accounting purposes
    ii. The process flow diagrams
    iii. Reasons why the input and output balances are not approximately equal
    iv. A description of how, when, where and why the substance is used or created
3. Whether there are technically and economically feasible options for reducing the use and creation of the substance at the facility that have not been identified in the plan that would result in reductions that are equal to or greater than those already identified in the plan
4. Whether improvements could be made in:
    i. The estimates of anticipated reduction of use or creation, releases to environment and contained in product of the substance
    ii. In determination of the technical feasibility of options

   iii. In determination of the economic feasibility of options

5. Whether improvements could be made to the estimates of the direct and indirect costs
6. Whether the steps and timetable set out in the implementation plan are likely to be achieved.

2.0 EXPERTISE RELIED ON IN PREPARING THE PLAN

This Toxic Substance Reduction Plan (Plan) was developed by a planning team that included Bert Huntley, the LPS/EMS Manager at Camtac, Dana Lauder, a Licensed Certified Toxics Reduction Planner, and Sean Williams, an environmental consultant.

Bert Huntley has intimate knowledge of all aspects of the production processes at Camtac and was the lead for developing the plan and providing input. Sean Williams was responsible for preparing the plan through consultation with the necessary personnel at Camtac and with advice from the Licensed Planner. All relevant data was collected from the appropriate departments.

The level of expertise relied on during the preparation of the Plan was sufficient that the involvement of any additional parties with relevant technical experience would not have improved the plan or increased the potential to reduce the use of manganese.

3.0 ACCOUNTING

Data and Methods Used

The total amount of manganese used at the facility is obtained from purchasing and inventory records from Camtac's purchasing department.

The manganese content of each material is determined using the material specifications. The accuracy of the calculated amount of manganese contained in the products entering the process varies depending on the product and the level of detail provided on the material specification for each raw material. In the cases where a concentration range is provided, the accuracy of the accounting could be increased with obtaining actual manganese content directly from the supplier.

All quantities calculated for accounting purposes are based on mass balance calculations. Based on the data available and the type of processes involved at Camtac, this is the most accurate and appropriate method for accounting purposes.

Process Flow Diagrams

Camtac keeps process flow charts at the Facility for all stages of production. The process flow diagrams provided for the purposes of this Plan are considered to be comprehensive and accurate, therefore there are no recommendations for this section.

Input/Output Balance

The input and output balances were calculated using a mass balances. Therefore, the inputs are equal to the outputs, and a recommendation is not necessary.

Description of how, when, where, and why the substance is used or created

The Plan satisfies this condition of the Regulation and I have no recommendations to improve the Plan regarding this requirement.

4.0 TOXIC SUBSTANCE REDUCTION OPTIONS

In Section 6.3, Camtac identified an option for changes to the machining process to reduce the amount of scrap produced. It is recommended that Camtac elaborate and expand on this option to identify what changes will be made to the machining process. This will make progress easier to tract.

Since off-site transfers for recycling make up 69,345 kg of 299,451 kg brought into the facility, I would recommend investigating ways to bring material into the facility closer to their final dimensions so that less material is machined off and less material is transferred off-site for recycling.

Many of the costs used throughout the Plan to determine economic feasibility appear to be estimated or assumed costs. Obtaining quotes or providing references to where the costs were obtained would help in assessing the accuracy of the economic feasibility analysis to ensure Camtac meets the goals set out in the Plan.

5.0 DIRECT AND INDIRECT COSTS

All costs associated with the use of manganese were obtained from the accounting department. All costs associated with the use of manganese have been accounted for and no additional recommendations can be made at this time.

6.0 IMPLEMENTATION PLAN

Camtac provided steps for each of the options to be implemented with an associated timeline. It is recommended that the steps and timeline be made more specific so progress is easier to track.

Should you have any questions on the above, please do not hesitate to contact us.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Dana Lauder, P. Eng.
Certified Toxics Reduction Planner - Licence #TSRP0014

SW/mg/7

APPENDIX B

CAMTAC PLAN SUMMARY

PLAN SUMMARY

Camtac Manufacturing
GUELPH, ONTARIO

Name & CAS # of Substance	Manganese	7439-96-5
Substances for which other plans have been prepared	NA	
Facility Identification and Site Address		
Company Name	Linamar Corporation	
Facility Name	Camtac Manufacturing	
Facility Address	**Physical Address:** 148 Arrow Road Guelph, Ontario N1K 1T4	**Mailing Address: (if different)**
Spatial Coordination of Facility	Easting: 556618.56 Northing: 4822974.18	
Number of Employees	446	
NPRI ID	10942	
Ontario MOE ID Number		
Parent Company (PC) Information		
PC Name & Address	Linamar Corporation, 287 Speedvale Avenue West, Guelph, Ontario N1H 1C5	
Percent Ownership for each PC	100%	
Business Number for PC	103333662	
Primary North American Industrial Classification System Code (NAICS)		
2 Digit NAICS Code	33 Manufacturing	
4 Digit NAICS Code	3336 – Engine, turbine and power transmission equipment manufacturing	
6 Digit NAICS Code	333619 – Other engine and power transmission equipment manufacturing	
Company Contact Information		
Facility Public Contact	Mr. Stu Burbidge, LPS, sigma, PM Manager	
	stu.burbidge@linamar.com	
	Phone: (519) 780-2270 ext. 318	Same address as facility
	Fax: (519) 780-2274	

PLAN SUMMARY STATEMENT

This plan summary reflects the content of the toxic substance reduction plan for Camtac Manufacturing (Camtac) for manganese, prepared by Conestoga-Rovers & Associates.

STATEMENT OF INTENT

Camtac Manufacturing (Camtac) is committed to playing a leadership role in protecting the environment. Whenever feasible, we will reduce the use of manganese in compliance with all Federal and Provincial Regulations.

REDUCTION OBJECTIVES

Camtac prides itself on technological innovation in order to produce high quality automotive parts in an environmentally responsible manner. Through this plan, Camtac determine the technical and economic feasibility of each option to determine which, if any, are viable for implementation at this time.

REDUCTION OPTIONS TO BE IMPLEMENTED

The following option has been identified for implementation to reduce the use and/or amount of manganese transferred:

- Work with suppliers to reduce Foundry Defective materials
- Reduce scrap levels on production lines by 0.25 percent

Work with suppliers to reduce Foundry Defective materials

This option is an on-going procedure at Camtac, with annual reduction targets that will change from year to year. The schedule for this reduction option is given below:

Step	Description	Estimated Timelines
1	Discussions with Foundry Suppliers	January 2013 - Ongoing
2	Implement improvements to materials receiving procedure	
3	Timeline for implementation of Manganese Reductions	End of 2013

Reduce scrap levels on production lines by 0.25 percent

This option is an on-going procedure at Camtac, with annual reduction targets that will change from year to year. The schedule for this reduction option is given below:

Step	Description	Estimated Timelines
1	Review of existing scrap procedures to identify possible improvements	January 2013 - Ongoing
2	Hold Annual Session to update operators based on new findings	Annual
3	Timeline for implementation of Manganese Reductions	End of 2013

Camtac has carefully reviewed the toxic substance use reduction options to ensure that there is no net negative impact to the environment or public health. The selected options will serve to reduce the amount of manganese used in the process, and will not create any toxic by-products.

CERTIFICATION BY HIGHEST RANKING EMPLOYEE

As of December 17, 2012, I, Andy Scapinello, 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 factually accurate and complies with the *Toxics Reduction Act, 2009* and Ontario Regulation 455/09 (General) made under that Act.

Manganese

Andy Scapinello
Operations Manager
Camtac Manufacturing

CERTIFICATION BY LICENSED PLANNER

As of December 17, 2012, I, Dana Lauder, certify that I am familiar with the processes at Camtac 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 23, 2012 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Manganese

Dana Lauder
Conestoga-Rovers & Associates
Planner License #TSRP00014
dlauder@craworld.com